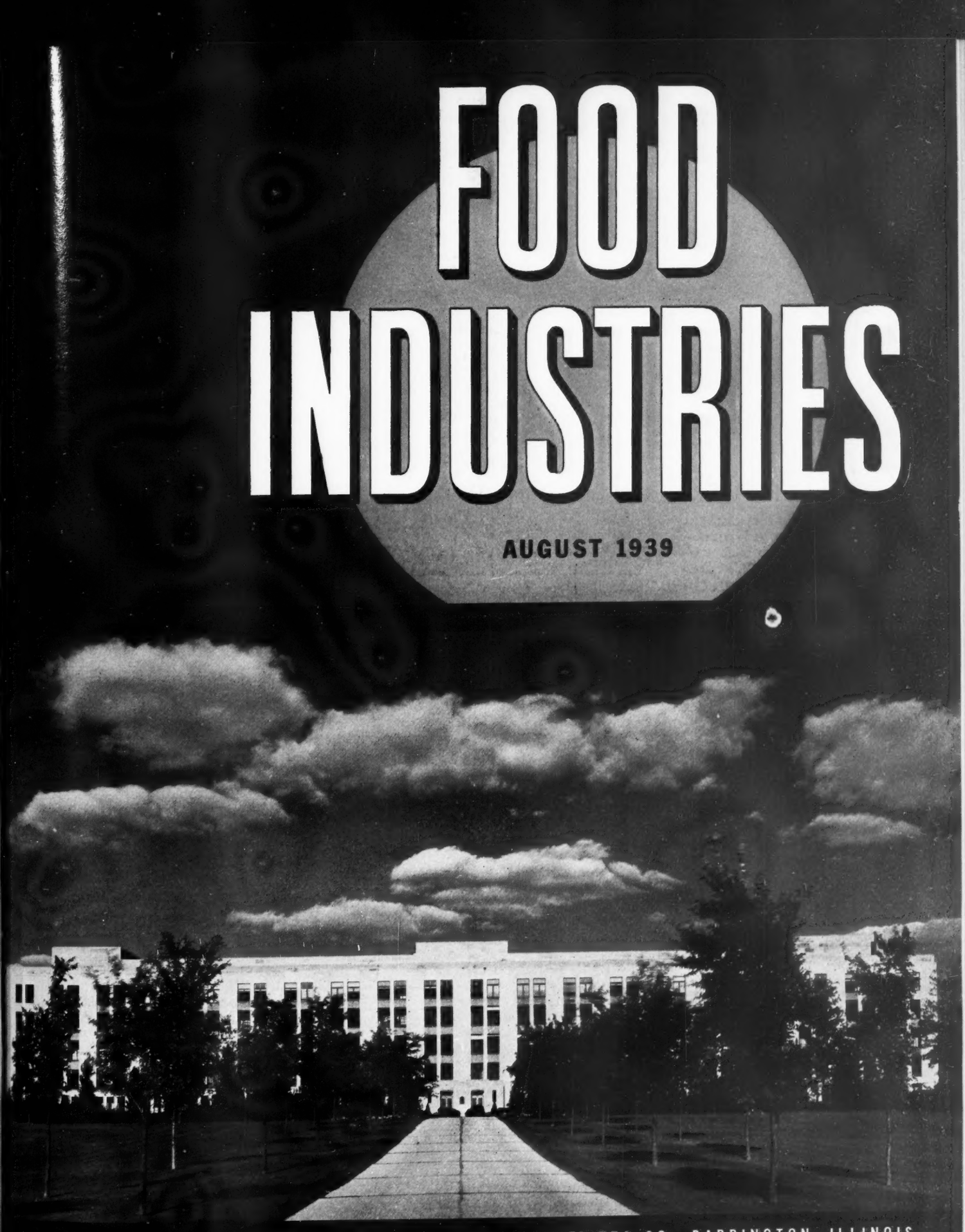
FOOD INDUSTRIES

AUGUST 1939

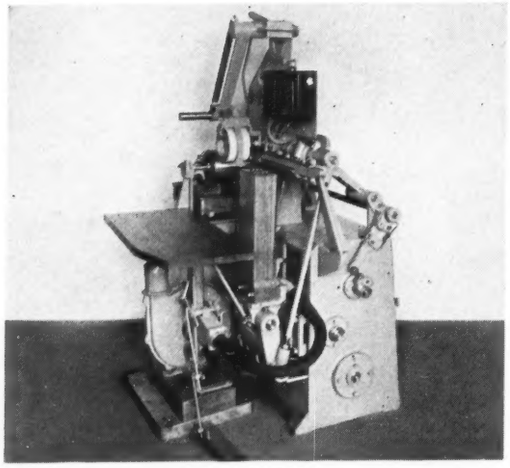


HOMES OF FAMOUS FOODS...JEWEL TEA CO., BARRINGTON, ILLINOIS

ANY SPEED YOU NEED IN FOLDING CARTON EQUIPMENT

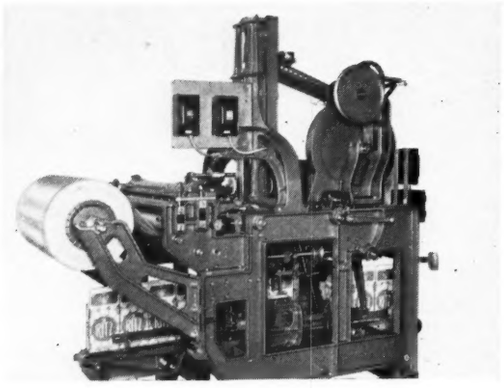
15 to 30

Ton pressure, block Bottom Sealing is just one of the many operations handled by Pneumatic's complete line of semi-automatics. The most versatile Coffee Weigher on the market is another Pneumatic semi-automatic unit.

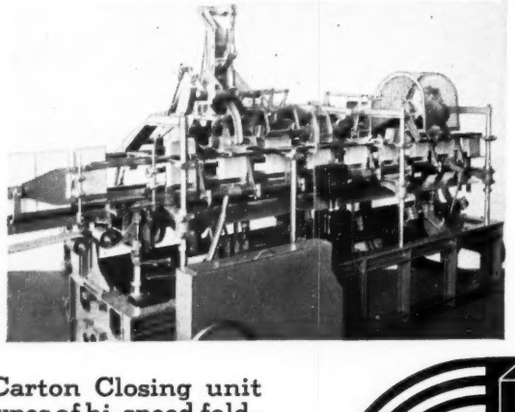


25 to 40

Make your own carton linings and insert them automatically. Feed, form, fill, weigh and close your cartons on co-ordinated Pneumatic hook-ups. This speed range is recommended for flexibility required to handle several sizes.



60 to 100



The combined Lining & Carton Closing unit illustrated is one of many types of hi-speed folding carton units Pneumatic builds. Tight Wrapping is another Pneumatic contribution to the effectiveness of carton packages.

The folding carton's ability to meet every major requirement for shipping strength, effective design, display value, package economy and consumer acceptance, accounts for its world-wide use as the basic package type for dry products. Miniature folding cartons are used for quantities as small as 4½ grams of powdered yeast. Giant suitcase sizes 70 times as large as the miniature carry 5 lbs. of soap flakes to market. Both are packed by Pneumatic.

Pneumatic semi-automatics bottom and top seal a wide variety of grocery products cartons at 15 to 20 per minute. A large soap producer uses a Pneumatic hook-up for turning out 105 soap powder packages each minute. These random examples show why more dry products are packed in folding cartons by versatile Pneumatic machines than by all other makes combined. The reason, guaranteed "lower cost per container!"

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In THIS *Issue*

• BREAK DOWN THESE WALLS

These United States, as the orators love to call them, are not so united after all. Last month, Ivan C. Miller gave us one installment of his series on barriers to interstate trade in foods. This month he throws more light into this legal labyrinth of restrictions and reprisals (see p. 444). Food manufacturers who fear the folly of breaking this country up into 48 trade-tight tyrannies should mark his words and look to their public relations.

• HOW TO REDUCE SHRINKAGE

Harvest season is the time when great quantities of fresh foods go into storage. And it is also the time when shrinkage and loss start, caused by loss of moisture from the stored foods.

To cut these losses to the lowest possible figure is a job for an expert. It requires an exact knowledge of the principles of air conditioning and long experience in the application of these principles. So FOOD INDUSTRIES and its readers are fortunate this month in having the article on page 429, by R. L. Pleuthner, engineer for Buffalo Forge Co. He draws on a wealth of case material to give practical solutions of problems in maintaining correct humidity for foods in storage.

From Mr. Pleuthner's article you will gather that the humidity problem is not solved by the equipment builder alone. Certain precautions must be taken by the men who use the refrigeration if even the best of equipment is to give satisfactory results.

• FILLER FOR THE FACTORY

Many a canner, vinegar maker, or other food manufacturer engaged in a seasonal operation, would like to keep his plant going for more months out of the year. One way to do this is to pack "prune juice," which is really the water extract of dried prunes. In his article, "Manufacturing Prune Juice," on page 432, W. C. Hoffman, of Berkeley, Calif., tells how this is done. Mr. Hoffman is a chemical engineer of many years experience in food processing, and is the developer of one of the methods of making prune juice that he describes in the article.

• LARD LOWDOWN

What with the killing of the little pigs and floods of cottonseed oil, the path of lard to market has not been smooth in recent years.

But a new day dawns. Improvements in manufacture and packaging give lard makers something to shout about. With supplies of this staple again ample, it promises to regain the ground that it lost.

The story is told on p. 438, by L. M. Tolman and G. A. Crapple, of Wilson & Co. As leading technologists of a leading meat packing company, they have the facts at finger ends.

In FORTHCOMING *Issues*

• FORMULAS

In response to a very definite reader demand that FOOD INDUSTRIES publish formulas for industrially processed foods, we expect to start a formula department early in autumn. And, gosh how we dread it! For there are always those who believe that, if they could only get hold of a formula for this or that, they would be on the sure road to riches. But when they come to and realize that a published formula is one that is no more than a starting point for a long series of tests and improvements, then the publication and its editors may come in for some wholly unjustifiable panning.

To illustrate the proper use of a published formula, we cite one experience where an original formula was tested, enlarged, varied and curtailed by 924 different tests before the product went on to the market. Yet even though this required over two years of effort, the product was capable of much further improvement.

Another matter about formulas needs thorough understanding. Every so often some one writes in to ask how to get the formulas for Campbell's soups, Heinz' pickles, Libby's meat products, etc. The answer is that we don't know. But we always call attention to the fact that Heinz has never run out of pickles, Libby has never been short of meats, and Campbell always has had all the soups for sale that the world would take. It hardly seems likely that another manufacturer who duplicates these products would add to the total volume sold. And, as for matching their production costs—well, try to do it!

But the customer is always right. If he demands formulas, he shall have them, the best that we can get authoritative sources to release for publication. We'll hope that some of them may prove to be inspirational if not useful.

• WHAT IS QUALITY

For many years now, the food manufacturing industries have discussed "quality control" and stressed its importance to successful operation and distribution. But, when they talk about "quality" control, they are not always talking about the same thing.

To clear up any disagreement on this point, FOOD INDUSTRIES has in preparation an article by an experienced food technologist. From his experiences in many lines of food processing, he will point out what this "quality" is, and how to go about controlling it.

• PASS THE SUGAR

It must be the heat. Anyhow the controversy over the costs and technology of sugar refining has ceased for the moment. But, we are assured, the boys will be at it again in September.

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Volume 11, Number 8 August 1939

The Talk of the Industry

» "UNEMPLOYMENT—the natural penalty for excessive wage rates. Shrunken sales—the natural penalty for excessive prices . . ." says the New York *Times* in discussing the WPA strike in mid-July. This concept of the responsibility of the individual for his own problems, be he laborer or executive, should be fully understood by everybody.

» JUDGING from the reports of several friends, supplemented by our own observations, it would pay certain top executives in the food group to visit their own World's Fair exhibits. Such a visit should be made incognito. Or, if this is impossible because the tops are personally known to those employed in the exhibit, then it should be done by—say their wives or someone who will report critically on what they may see or experience.

Some of the help are getting bored and indifferent. Others fail to keep

pepped up. If an exhibit is to degenerate into a customer alienating device, it would be advisable to institute a prompt inquiry as to causes and proper remedies.

And one cannot believe that an exhibit left entirely unattended with a sign warning visitors not to use the exhibit as a place to eat their lunches is doing anybody any good.

» WITH THE ADVENT of the effective date of the new food law, June 25, 1939, many users of vanilla beans have stocked up heavily. Probably the crop shortage in the beans had something to do with it. And prices for high grade extracts will be high for some time. Which creates a new situation.

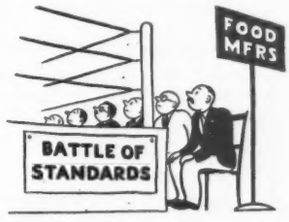
Heretofore, many buyers of flavors specified a true extract fortified with so much vanillin, ethylprotocatachuic aldehyde, etc. Now, in anticipation of food law enforcement, they are buying the pure extract and doing their own fortifying. Meanwhile, the extract manufacturers wonder what next.

» DR. THURMAN ARNOLD, Assistant Attorney General, has lost his conspiracy case against the Chicago milk dealers on their demurrer. A demurrer is a plea to the effect, "Maybe so, but what of it?" The court ruled that the Agricultural Marketing Agreement Act removes marketing of milk from the purview of the Sherman Act. So there is no case at all unless the Supreme Court overrules the lower court later. How such a reversal might be reached is too much for lay minds to comprehend.

» THE TIMES seem to be getting better. For the first time in many months we have heard of jobs seeking properly qualified men of specialized training. Usually it has been the other way around in recent years.

» EXECUTIVE HEADS of companies in the food business are making a big mistake by not being present at hearings on standards of identity under the new Food, Drug, and Cosmetic Act.

The food manufacturer's part in the problem of creating proper standards



is a job for the joint ability and brains of food technologists and the heads of companies. It is not a job to be delegated to the legal department and dismissed from further executive thought.

One of the most important reasons for being present in person is to be able to listen—and even partake—in the off-the-record arguments.

As a means of knowing what is really going on, nothing will take the place of a ring-side seat.

» CONGRESS is arranging for Uncle Sam to spend more money next year than in any previous twelve months. This is the form of "economy" which has developed out of the political situation. Each party or bloc hopes to be able to prove to the folks back home that *it* was instrumental in providing these funds.

Understanding of these facts is very important for the food industries when they are confronted with any phase

of the Washington problem. Normally, politics of this sort is not a part of the management of food factories. But right now the unusual prevails. Everything from the size of the tax bill to the availability of raw material is influenced by Washington. And the influence of Washington is "Politics."

An Outside View of Our Problems

"THE TWO YEARS 1936-37 and 1937-38 have seen marked changes in the world agricultural production," says the April Monthly Bulletin of the International Institute of Agriculture in Rome . . . "As a result, while, during the preceding two or three years the stocks of the principal agricultural staples had been decreasing, in 1937-38 they began again to increase. This sudden change in the supply of agricultural products had a far-reaching effect upon agricultural prices and upon the world agricultural situation generally . . . In the spring of 1937 a reaction set in. The recession began in the United States and then spread over the greater part of the world."

Perhaps after all, the New Dealers will someday quit blaming U. S. business men for things that have their origin in world wide conditions. Years ago, FOOD INDUSTRIES, **6**, 124, 1934, pointed out that the world wheat surpluses began to pile up on 1927 as a result of foreign production.

Hors d'Oeuvres

• The newest thing in culinary competition is an amateur cooking contest for career women. This apparently makes the housewife a professional cook. But don't tell the missus. She'll want the pay of a chef, which may be more than you make.

• *The old idea that coffee keeps one from sleeping at night is being changed by advertising to the opinion that it stimulates you during business hours and helps you to do bigger and better things. The coffee industry must have drunk some of its own stimulant.*

• When was the first single-service paper container for milk patented? Bet you miss it by a quarter of a century. The date is 1906.

• *Coca-Cola has the exclusive soft drink concession at the World's Fair. But Fair goers who chance to gaze skyward during the pause that refreshes see "Pepsi-Cola 5c" emblazoned across the heavens in smoke writing. You just can't keep a strong competitor down.*

• We're afraid that the Heinz chemiculture exhibit at the World's Fair will start something. An enterprising styler of women's chapeaus is liable to turn out a model with a bouquet of real flowers or a bunch of radishes growing out the top.

• *There is in Michigan a statistician with a trick method of estimating cherry crops. He drives through the fruit belt at 50 miles an hour, and if he sees cherries on the trees at that speed he knows the crop will be fair to good. If he persists in looking for fruit while driving at that speed, he'll end up in a bury box.*

• By making caramels half size, confectioners report that tooth pull is reduced 50 per cent and other chewing difficulties eliminated. But the stuff will still overload grandpaw's Sunday teeth.

• *A streamlined turkey is being developed by the Department of Agriculture. The idea is to provide a bird small enough to fit comfortably the ovens of modern kitchens and the "tummies" of modern families. It is expected that another five years will elapse before the birds are on the market, so don't tighten your belt yet.*

• Seventy per cent of a group of 60 companies which earned more in 1938 than in 1929 were notable for their scientific research, Clarence Francis, General Foods president, recently remarked. Then, as if to keep sales managers happy, he added that many of these companies were also outstanding in their developments of merchandising and advertising.

• *Remember the big fuss Western senators made over the purchase of South American canned corned beef for the Navy? Then imagine the embarrassment of those patriots when Senator Norris showed them a can of corned beef from their own Senate restaurant. The label bore the legend, "Produce of Brazil."*

• Baby food was born in the brain of a young father burdened with the care of two infant sons whose mother lay ill in a hospital. The father was the late Harold H. Clapp. His struggles with a physician's formula for baby soups inspired the development of an important new industry.

• *During the first seven weeks of the New York World's Fair, Beech-Nut gave away 889,880 pieces of gum, 865,500 packs of candy and 416,000 cups of coffee. Which shows how much business you could do if you weren't so commercial as to put a price on your product.*

F. K. L.

A Lesson from Russia

WHEN YOU visit a big fair, such as the World's Fair at New York or San Francisco, your motive for making the visit is doubtless the desire to see and to learn about things and places you have never seen. Your approach is probably that of a gratification of a desire. But there is much more to be learned at a fair than the exhibits themselves will display.

To all who go on such a tour we commend that you also take advantage of the opportunity to learn more about the behavior of people in the mass. Ask yourself: What do people look at, and why? And, more important: What do people ignore, and why?

In our visit to exhibits other than foods we have utilized the foregoing analytical approach and pause at this point to comment on the Russian display. Here is a huge building, air conditioned, equipped with escalators, brilliantly lighted. Apparently no thought of cost entered the minds of the designers. It is positively lavish. To us its gay colors, and obvious propaganda for Socialism, was not a garish, nor gaudy, display that often offends conservative good taste. It was quite the antithesis of the British Pavilion which is, by all odds, the most restrained, almost regal exhibit on Flushing Meadows.

If you are accustomed to observe people closely, the first thing that will be noted is the great preponderance of young people who are among the sightseers. As you approach the building you will see a steady stream of youths emerging with arms full of booklets, folders and, what you will correctly surmise to be, propaganda. And when you pass through the big building and keep asking yourself why? and for what purpose? you will discover that the folks in U.S.S.R. are master showmen. They have very subtly and successfuly portrayed Russia as a land that is a paradise for youth. A paradise, not because it is Russian, but because it is Socialistic.

Every yearning of youth for good times, freedom from hard physical labor, sports, aviation, education, culture, adventure, and the natural desire of youth to be able to enjoy the physical comforts that, in other lands, can be afforded only in one's mature years —the normal dislike of youth for the long, hard way of working and saving in order to get ahead and be a success in life—the normal attitude of youth for economic equality (for all normal persons develop through a Socialistic period in their late teens or early twenties)—all these and many more

desires of youth are catered to and "sold" to many thousands of young people every day. The idea is to catch them young when they don't know any better.

If any normal young person emerges from the Russian exhibits without a firm conviction that they, too, could have all the good things displayed there, if the United States were only a Socialist State, it would be almost a miracle. One has only to visit this marvelous propaganda show with open eyes and an inquiring mind to see the most effective educational show at work we have ever seen. It is mass production of indoctrinated minds. To be sure, bigger crowds visit the General Motors and General Electric displays, but they do not come away with the starry-eyed enthusiasm for social change that you can see so plainly in the youngsters who emerge from this idyllic picture of one side of life across the seas.

Those who anticipate ever planning any educational exhibit must not fail to observe and learn all they can about how the Russians attract young people. A number of important lessons for all of us are to be learned there.

Only Six Months of Grace

CONGRESS has provided that many of the label requirements of the new food and drug law need not be observed until next January. There has been many a sigh of relief among food men. This period of grace was much needed. But . . .

There are two dangers which food manufacturers should avoid. In the first place, six months is a very short time; no one must dally in carrying forward the necessary label improvements. There will be no further extension of time for the man who neglects his task of making label revisions and preparing to have his goods in the channels of distribution, properly identified, by Jan. 1, 1940.

In the second place, it is important that new standards of identity be promptly developed. These standards will greatly facilitate the labeling of many goods. In fact they are essential for satisfactory workable label practice in many divisions of the food business. Industries that have standards cases before the Secretary of Agriculture must press these diligently. Otherwise, the new and needed standards may not be available by the first of the year. In that case, elaborate temporary labels, giving the ingredients of compounded foods, will be necessary.

Every food manufacturer will want to press his trade association or his attorneys in these matters, even in the dog days of August. Again, we emphasize, six months is a short time!

"Food Will Win the War." Remember?

APPARENTLY some of the men who made our laws and restrictions, back during those days, have very faint memories about them. Just as though "arms, ammunition and implements of war" were the only things that were important. They want to continue the ban on shipments of any of those items to any belligerent, once war is declared.

A disgusted State Department official recently remarked that Senators Nye, Clark, Borah, and Bone were "working feverishly to keep us out of the last war."

But how about food?

Everybody knows that if war comes in Europe the most crying need of Britain will not be guns or shells, or even "implements of war," to repeat the legal language, but food. She has been stepping up her production of munitions and airplanes until pretty soon that will not be a problem. The raw materials may continue to be, but they will not be banned by existing law!

The question arises: How will a ban on the present black list—"arms, ammunition and implements of war"—keep the United States neutral if we are shipping steel and scrap iron, cotton for munitions and food to feed British armed men and civilians? Especially if Hitler resorts to the same tactics that von Tirpitz attempted back in 1917, to wit, a submarine blockade of the British Isles?

The answer is simple. It won't. But also the answer to why the Solons are doing their snake dance to keep us out of war is simple. They want to appeal to the "keep us out of war" folks. But they do not want to offend the farmers by admitting that in the event of war, food shipments to the belligerents will be even more important than munitions!

Second Food Technology Conference

THE second conference on food technology has proved to be a greater success than the first which was held in October, 1937. Dean Prescott and Prof. B. E. Proctor of M.I.T. did a splendid job in perfecting the type of program, procuring speakers and making all the necessary arrangements. M.I.T. is also to be complimented for taking the initiative in organizing the two conferences and bringing together the many hundreds of food technologists from all parts of the United States and several foreign countries.

Compliments are likewise in order to the food manufacturers who had the vision to send their representatives to the conference and permitted them to speak freely and frankly of the problems faced by their respective industries and the manner of their solution.

Institute of Food Technologists Formed

JULY 1, 1939, is the date of birth of the Institute of Food Technologists, immediately following the adjournment of the Second Conference on Food Technology. Every man who rates the term "food technologist" will be gratified to know that a permanent professional organization has been formed which will place Food Technology among the recognized technical professions.

The admirable choice of Professor Samuel C. Prescott, Dean of Science, Massachusetts Institute of Technology, Cambridge, Mass., as its first president, Dr. R. C. Newton of Swift & Co., as vice-president, and Dr. George J. Hucker, of New York Agricultural Experiment Station, as secretary-treasurer are indicative of the high aims of the new organization.

Another worthy feature of the new Institute is the provision in its constitution which recognizes that a man may qualify for membership as a full Member despite any lack of formal university or college training, provided he has learned through practice about the fundamental sciences and engineering which underlie Food Technology. Youngsters who are on their way can become Affiliates.

At the organization meeting more than 138 persons were present. The Institute of Food Technologists is already a good sized infant. The very size of this group also indicates the widespread recognition of the need of an organization. And the high caliber of those who partook in the organization meeting—all were tops in their respective lines—promises that the I.F.T. will be a worthy and permanent influence in the future of the food manufacturing industries.

Industrial food technologists are urged to join this undertaking not only to gain the individual benefits from association with other food technologists, but also to assist in furthering the development of food technology as a profession.

Regional Laboratories to Study Foods

UNDER THE TERMS of the Federal Agricultural Appropriation Bill, the Regional Laboratories of the U. S. Department of Agriculture are expected by Congress to include research on food uses as well as non-food uses of the agricultural raw materials that are now in burdensome surplus.

When studied in connection with the act which created the Regional Laboratories, this move places some exceptionally difficult problems before the research staff, for the policy has already been laid down that any new uses to be developed by research are not to be such as will displace existing uses for agricultural raw materials.

Agriculture demands additional outlets for its production but one group of farmers does not propose to relinquish any existing markets for the benefit of other farmers. This restriction, coupled with the normal inelasticity of the total food demand (food consumption remains practically constant in good times and bad), does not warrant much optimism for future results via the route of food uses. Nevertheless, agricultural politicians must put on a show if they seek re-election.

True Fruit Flavor Defined

TRUE FRUIT FLAVORS come under the control of both the Food and Drug Administration and the Federal Alcohol Control Administration. The problem of the latter is to define true fruit flavors in such a manner that, if they are true to the definitions, nobody can drink them as a beverage.

Under the most recent F.A.C.A. ruling, 20 per cent of ethyl alcohol is the top limit for alcohol, but each gallon of flavor must contain all the solubles from 25 lb. of fruit. Those in the know say that this much fruit acid cannot be drunk by the most besotted sinner without gagging until he sees stars.

Those Over-supplies of Labels

BUYING POLICIES of some concerns seem to need overhauling, for the advent of the effective date of the new food law has revealed some important weaknesses. One of the more spectacular of these is the matter of labels and packaging supplies. Some concerns are reported to have on hand as much as a four-year supply of old-law labels.

Inquiry reveals the fact that in most such cases the purchasing department has been allowed to buy in any quantity its fancy dictates without any regard for possible label changes in the normal course of events. Also, despite the further important fact that a new food law has been in the making for more than five years, some purchasing departments have gone haywire on forward commitments.

In order to save 5 or 6 cents per thousand labels, purchasing managers have at times ordered supplies far beyond anything that prudence would dictate. A packaging department that well understands the problem of obsolescence of labels and packages could operate without any cost to the company on the money it could save by preventing excessive purchases.

Organized Labor Blocks Improved Quality

EFFORTS to improve the quality of fish taken along the North Atlantic Coast have been made completely ineffective by the action of organized labor. Every food technologist knows that punching holes or cutting into any food will carry bacteria and mold spores from the surface to the interior and thereby curtail the merchantable life of the food. It is the same sort of problem in slicing of bread or the handling of fish by pitchforks.

In England the practice has long been to avoid such bacterial contamination of the flesh of fish by prohibiting the use of forks. In June of this year all the New England fishing companies voted likewise to abandon forever the use of forks on the same day, merely as a step forward in controlling quality.

The experiment lasted only a single day. Organized labor decided that the fork was the tool to use—not the human hand—and this commendable improvement has been effectually stopped. It now looks as if all fish handlers must be thoroughly educated in bacteriology before any further improvements can be made.

Treason?

EVERY NOW AND THEN, one of our cash customers gets nasty and objects to our inclusion of anything about brewing technology in FOOD INDUSTRIES. Several of the brethren hold that the methods used in the manufacture of beer are inimical to all that is good and holy (especially to the businesses in which they are engaged).

May we suggest that this publication deals in manufacturing and distribution methods—not in the relative merits of the foods themselves. If you don't like spinach in your own diet, that fact should have no bearing on your interest in how to wash the raw material free from bacteria. If you despise milk and loathe its taste, that fact ought not to deter you from finding out how a dairy learns to control its temperatures better or develops a new technic in bottle cleansing and sterilizing, if such improved manufacturing methods could be useful to you or your business.

Some of the loudest complaints come from beverage manufacturers in the "still" fruit and carbonated groups. Yet the most advanced technology of fruit juice canning and bottling is borrowed bodily from the best brewing practice. Food technologists are beginning to discover that oxygen is very bad for any food liquid, and especially bad for citrus juices and beer. So now the better citrus juice bottlers and canners are adopting the brewer's trick of blowing carbon dioxide or nitrogen into the top of the container to get rid of air immediately prior to applying the closure.

And a more interesting fact is that this particular development did not actually originate in the brewing field.

Deflating Tradition

SCIENTIFIC RESEARCH is unpredictable as to its effect on tradition and old wives tales. Sometimes it confirms, sometimes repudiates.

In Germany, this saying used to hold: "The Agricultural Experiment Station proves that the farmer was right."

Recently a well known scientist remarked to a scientific audience that "Research is proving that grandmother was right (on herbs)."

And because we ourselves have cured many thousands of boxes of cheese at 32 to 34 deg. F. we have been prepared to defend this temperature against all others. But research does not support this tradition. The Bureau of Dairy Industry finds that you use 34 deg. F. for cheese curing only if you have young cheese that is not of the best quality. You employ the low temperature to get a cure without accentuating the cheese defects. In other words you compromise between the forces of good and bad.

If, fortunately, you start with young cheese of good quality—top quality—you can cure it at 50 deg. F. in a much shorter time. And you will get a far better tasting cheese than the same one cured at 34 Deg. F. In fact, it is of superlative quality.

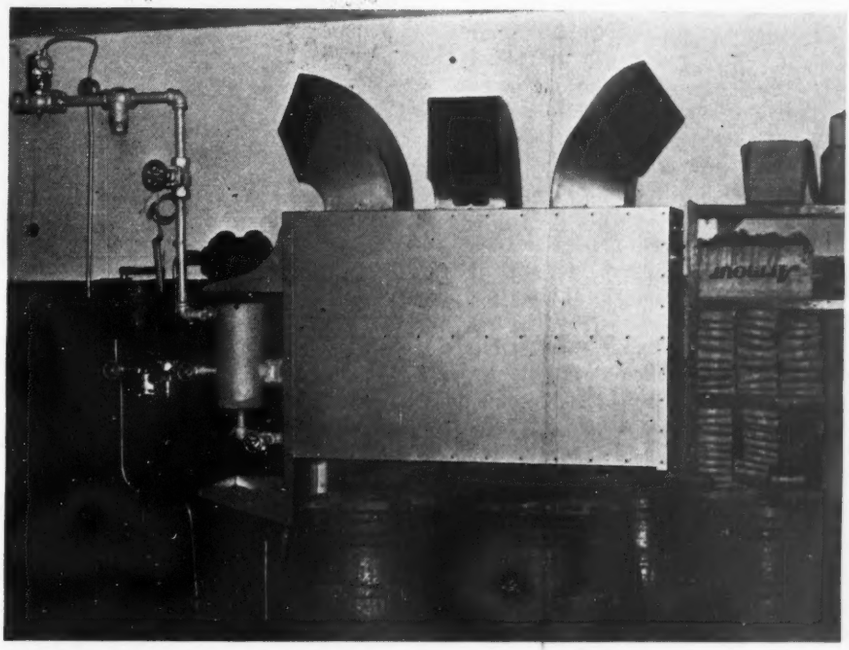
Which goes to show that nothing, not even old traditions, should be accepted without question.

Humidity Control *Reduces Shrinkage* in Cold Storage

What must be done to maintain high humidity to prevent products from dehydrating and losing weight

By R. L. PLEUTHNER
Engineering Department
Buffalo Forge Co., Buffalo, N. Y.

WITHIN the past few years a considerable increase has occurred in the number of cold storage installations for perishable foods, and much work has been done in determining the optimum conditions at which many of these perishables should be stored. The maintenance of the proper relative humidity is an extremely important factor in cold storage. It is of great economic importance that a food be stored at its best humidity even though the actual amount of water vapor present in the air at low temperatures is relatively small. At the "best" or optimum humidity, there is a balance between the favorable and unfavorable factors.



In meat storage rooms, high relative humidity is required to prevent excessive dehydration and loss of weight. Which means that the difference between the temperature of the air and that of the coil in this floor type unit cooler must be small. It also means that the room must be well insulated and of as nearly airtight construction as possible.

▶ ***High humidity cold storage, ideal of all good practice, can be attained by proper methods.***

No matter how good the equipment may be, there are other factors which you, not the equipment builder, must know—and must incorporate. First, you must have a cooling surface big enough to do its job on a small temperature differential. Otherwise, you will dehydrate the air and lose moisture from your product. Second, your storage rooms must be airtight, or nearly so, and well insulated. Otherwise, you will have to lower the evaporator temperature and boost the air velocity. This means excessive dehydration.

In other words, if you want high humidity cold storage you have considerable responsibility. How to meet that responsibility is told by the author in an article of interest to

All Food Manufacturers

Consider, for example, the cold storage of beef. High humidities in beef rooms greatly reduce the loss of weight or shrinkage, but, on the other hand, these high humidities increase the rate of bacterial growth. Importance of relative humidity is illustrated in the following figures taken from "Refrigeration Data Book." The loss of weight per day from a quarter of beef at 32 deg. F. is 0.12 per cent at 95 per cent relative humidity, 0.30 per cent at 85 per cent relative humidity and 0.60 per cent at 75 per cent relative humidity.

At a slightly higher temperature, 40 deg. F., the respective shrinkages, given in per cent, are 0.15 at 95 per cent relative humidity, 0.45 at 85 per cent and 0.76 at 75 per cent. This shows that within the practical temperature range for beef, 31 to 40 deg. F., the effect of temperature is small (about 25 per cent) when compared with that caused by a change in relative humidity from 95 to 75 per cent.

The optimum range of relative humidity for commercial practice is from 85 per cent to 95 per cent. It is the purpose of this article to show how a specified high relative humidity can be maintained, rather than to present the proper design conditions.

Humidity of air in storage cannot be considered apart from the problem of air circulation. A certain amount of moisture always works its way to the surface of cellular foods. It is necessary, therefore, that the food be surrounded by an atmosphere which has not only the correct dry bulb temperature and relative humidity, but the correct rate of air movement. Proper air movement is necessary to

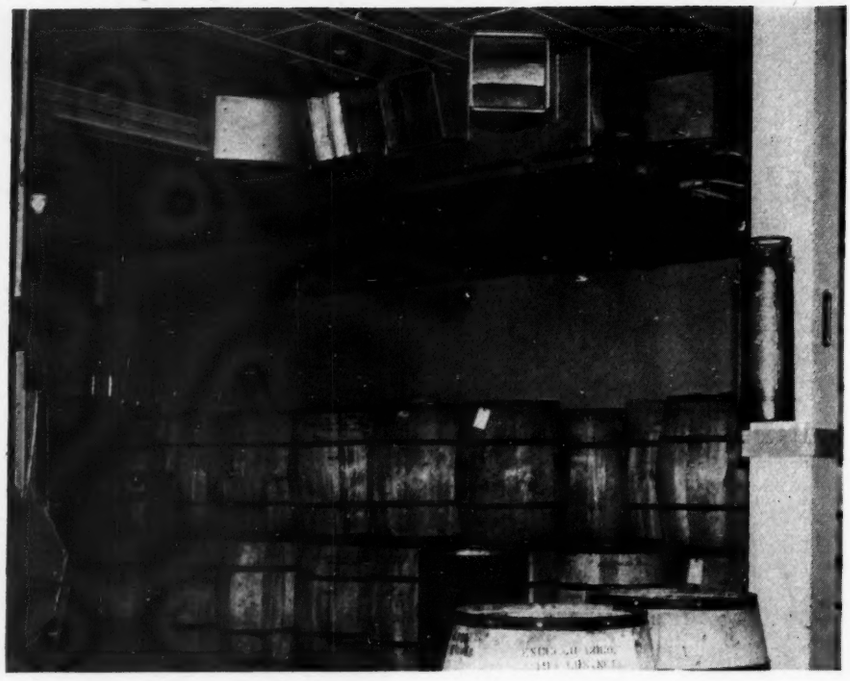
carry away the moisture which is working its way to the surface, if wetting of the surface is to be avoided. If the air motion is too fast, surface drying will occur, and in turn, dehydration of the entire food will take place. On the other hand, if the air movement is too slow, the food will be surrounded by an air film of very high humidity. This will cause the food to become wet and thereby promote bacterial as well as mold growth. It must be remembered that the air at the surface of the moist food has a much higher relative humidity than the air in the room.

Consider a typical cold storage room in which food, such as beef, is to be stored for a considerable length of time. Such a room should be well insulated, with as much as 8 in. of cork or the equivalent of other insulating material, to minimize heat gain. And if the room is an inside one, the sun effect will be eliminated. To prevent infiltration of outside air, the room should be of airtight construction. In many cases, airlocks on the doors are used, and since the doors are opened at infrequent intervals the load due to infiltration from this source is usually small. Unless proper conditions of insulation and airtightness are attained, it will be necessary to lower the temperature of the refrigerating medium and sometimes to increase the air velocity to compensate for these deficiencies. The effect of such compensation is to dehumidify the atmosphere more than is necessary, and this, in turn, will be reflected by shrinkage losses in the product.

Where the food in storage consists of living plant tissues or animal tissues, the main heat load after the product has been cooled to the proper temperature is the heat given off by respiration. Respiration values are given in most books on cold storage.

The latent heat load comes from two sources: infiltration of fresh air carrying moisture (at certain seasons of the year), and evaporation of moisture from the stored product. In the case of a very tightly constructed room, infiltration should be very small, but it is difficult to estimate the latent heat load arising from evaporation of moisture from the food. (This moisture will give off heat when it is condensed in the evaporator.)

In general, in computing the heat load, it is best to figure all of the sensible heat gained and then add a sufficient amount to include any latent heat which may be present. The bulk of the total cooling load, then, consists of the transmission and product loads, and may be considered as all sensible heat.

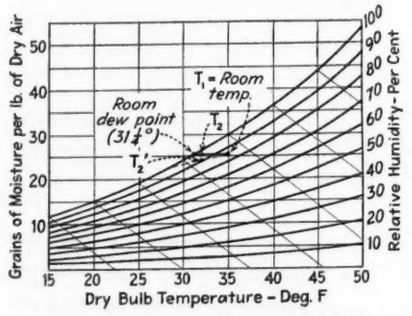


Chocolate storage room in which proper air conditions are maintained by a suspended type unit cooler.

It is important that the heat transmitted through the insulation and the heat from occupants, electric lights or infiltrated air be reduced to a minimum. This is important, not only to cut down the size of cooling equipment needed, but also to reduce amount of air handled. To illustrate:

Suppose that a room must be maintained at 35 deg. F. with 85 per cent relative humidity, such as would be appropriate in apple storage. Under such conditions, all of the air is to be recirculated. Which means that the cooling unit need handle only the room air. To maintain this humidity with a surface type of cooler, the coil surface temperature must be close to the dew point of the air in the room. The dew point is that temperature at and below which condensation of water vapor will take place. For two reasons (because it is difficult to estimate the latent heat load, and because the main problem is keeping up the humidity), it is best to figure that all heat to be removed is sensible heat. By following this assumption, the air will not be dehumidified.

To illustrate the point more clearly, a conventional psychrometric chart is shown. Assuming that the air is not to be dehumidified, the coil temperature in the cooling unit must equal the dew point of the air in the room and, in this case, is about 31¼ deg. F. The air passing through the cooler is cooled along a line of constant dew point (the dark horizontal line on the chart) to a dry bulb temperature



Conventional pyschrometric chart

that is slightly lower, so that when it leaves the unit the room load will heat it up to the desired room temperature. It is impractical to cool the air all the way to the saturation curve, *i.e.*, to the dew point, since to accomplish this would require an infinite number of cooling coils. That would run up the cost considerably. In actual practice, the air is cooled to some intermediate temperature, T_2, between the entering temperature and the coil temperature, yet quite close to the saturation curve or dew point. The temperature of the refrigerant must be such as to maintain the coil surface temperature at the room dew point. If the refrigerant temperature is too low, thereby causing the coil temperature to be below the room dew point, the air will be cooled along the dotted line to T_2' and moisture will condense out of the air. In other words, the air in room will be dehumified and cause drying of product.

As previously stated, there is al-

ways some latent heat load, and it is common practice to allow for this by adding one-third to the estimated total sensible heat load. This assumes that the heat load is made up of 75 per cent sensible heat and 25 per cent latent heat, a condition which is average for the cold storage of many foods. When determining the proper refrigerant temperature, it is sufficiently accurate to assume that the coil temperature is half-way between the wet bulb temperature of the air leaving the coils and the entering refrigerant temperature.

It can be seen from the psychrometric chart that the air can be cooled but a small number of degrees without dehumidifying it. In the preceding example, it would be practical to cool the air to about 32 deg. F., which is only three-fourths of a degree away from the coil temperature. With such a small allowable temperature drop, namely, 3 deg. F., a large amount of air must be circulated, depending, of course, on the magnitude of the cooling load. Although a good air circulation is beneficial, too much air causes high air velocities with consequent drying, and also adds to the problem of properly distributing the air throughout the room.

Cold storage operation must be divided into two periods, loading, which is relatively short, and storage. Although it is desirable to maintain a high humidity during the loading period, it is impractical to install a cooling system to take care of the very high load during this time and yet allow the air to be cooled only a small number of degrees in order to keep up the humidity. A better scheme is to select the size of evaporator which is correct for the storage period when the load is comparatively light and the storage time long, and also to have a high refrigerant temperature so as not to dehumidify the air. But it is also necessary to have a compressor capable of taking care of the loading period by using a much lower suction temperature. Naturally, the humidity will drop, but with the customary short loading period, a low humidity for so short a time is acceptable. This represents the most economic practice. During loading, the humidity of the air can be increased by wetting the floor.

To control conditions in the room when the coil surface temperature is such as to maintain the proper relative humidity, all that need be considered is the dry bulb temperature. A room thermostat operating a magnetic starter on the compressor motor controls the room temperature in those cases where the compressor serves a single cooling unit. When several units are served by the same compressor, the thermostat operates a magnetic valve in the individual line leading to that room. A hand operated back pressure valve is usually placed in the suction line to control the refrigerant temperature. In this manner, the coil temperature can be varied to meet the requirements of both loading and storage periods.

Within the past year, one of the largest apple growers in the East has installed storage equipment for this product. This storage has a capacity of 90,000 bu. of apples and is cooled by six unit coolers of the surface type. These units have steel coils and use ammonia as the refrigerant. The storage rooms are held at 32 deg. F. with 85 per cent relative humidity during the storage period, but during the loading period the humidity is allowed to drop to 60 per cent. The building is insulated with 12 in. of granulated cork in the walls and ceiling, and a 2-in. layer of corkboard on the floors. An analysis of the load in tons of refrigeration is given below:

	Transmission, Occupants, Infiltration, Lights	Product	Total Plus 1/3
Loading period	12.1	44.5	75.1
Storage period	8.6	5.1	18.2

From the table it can be seen that the total tonnage of refrigeration during loading is over four times as great as that required during storage. This is due to the high product load during the loading period. To maintain the high relative humidity during storage, a refrigerant temperature of about 26 deg. F. is used, while during loading the refrigerant temperature is dropped to about 15 deg. to accommodate the increased load. It is also seen from the tabulation that the heat gained from transmission, occupants, heat infiltration and light load is only 8.6 tons during the storage period. This favorable condition has been made possible by the good insulation and tight construction of the building.

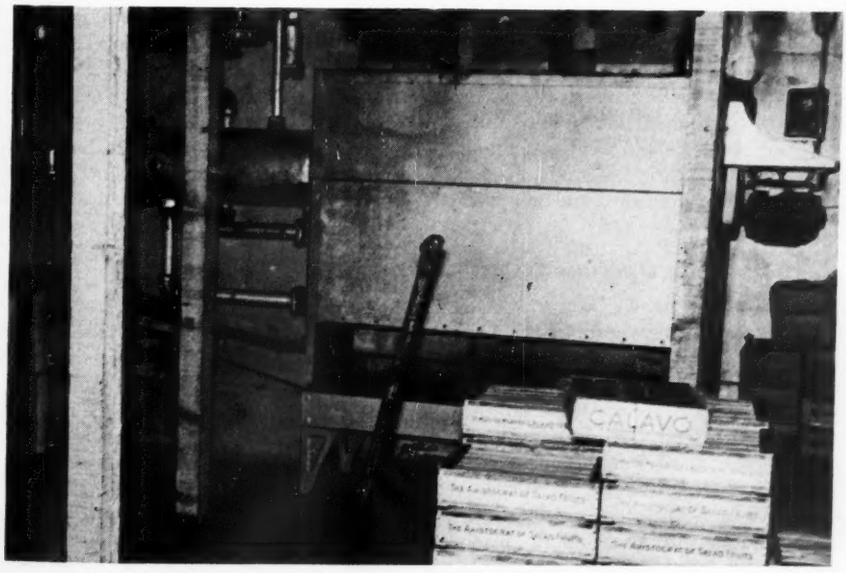
Important points to be considered are as follows:

1. Practically any relative humidity can be maintained provided that the proper refrigerant temperature and the proper amount of air circulation are selected. Due to psychrometric principles, it is necessary that a relatively high refrigerant temperature and a large circulation of air be used. This relationship is true regardless of type, kind or make of cooling coils.

2. The evaporator, or cooling unit, should be selected as adequate for the load during the storage period when operating with a high refrigerant temperature. But it also requires a compressor capable of taking care of load during loading period, using a much lower refrigerant temperature.

3. It is very important that a cold storage room shall be well insulated and tightly constructed so as to reduce the heat gains due to transmission of heat and infiltration of air.

4. The cooled air must be distributed properly and uniformly throughout the room in order to avoid high velocity air currents over the food surface, because high air velocity will dehydrate the surfaces with which it comes in contact.



Dehydration of fruits and vegetables during storage is detrimental to quality. In this fruit and vegetable market storage room, the unit cooler is designed so as not to dehydrate the air excessively.

Manufacturing Prune Juice From Dried Prunes

Two commercial methods are in use and these can readily be carried out in slack seasons by manufacturers of cider, vinegar and like products, offering an opportunity to operate continuously and thus reduce costs by spreading overhead charges

By W. C. HOFFMAN
Chemical Engineer, Berkeley, Cal.

PRUNE JUICE, as packed for beverage purposes, is not in the truest sense of the term a juice. Rather it is a water extract of dried prunes, and a statement to this effect must be made on every label.

Prune juice is a pleasant juice having the distinctive flavor of dried prunes, and a color similar to that obtained in the liquor from home-stewed prunes. Although usually packed unsweetened, sugar may be added if declared on the label. A mild edible acid is sometimes added to bring out the flavor, and to give life to the juice, much as carbon dioxide enlivens a carbonated beverage. Prune juice has a definite place in the diet due to its high mineral content, fruit sugars and pectins, and the laxative and tonal effects which the juice has been shown to possess. It is best when chilled and is generally served as a breakfast drink.

There are two prevailing methods for the commercial preparation of prune juice. The first, known to the industry as the diffusion method, consists essentially of extracting the soluble constituents from the dried fruit by means of successive leachings with hot water. The second, known as the disintegration method, consists of breaking the dried fruit down by vigorous cooking in water and recovering the extract by means of a hydraulic press.

In the diffusion method, the fruit is thoroughly washed to free it of adhering dust and lint and placed in large wooden tanks, usually 5 ft. in diameter and 7 ft. in depth. The tanks are fitted with a perforated steam cross or a closed coil to keep the extracting water at 200 deg. F., or above. In many instances the tanks are also fitted with some sort of dumping device, or mounted on a swinging carriage which permits dumping. A convenient charge for such a unit is 350 to 400 lb. of dried prunes.

After the fruit is in the tank, it is covered with hot water at a temperature of 200 to 210 deg. F., in the proportion of 25 gal. of water to each 100 lb. of fruit. The fruit is allowed to soak for 2 to 4 hours, while the temperature of the extracting water is maintained at 200 deg. F. by means of the heating unit in the tank. After the alloted time, the liquor is drained from the fruit and stored. Fresh hot water is placed upon the fruit but the quantity is decreased to 15 gal. for each 100 lb. for this second extraction. After another extracting period of 2 to 4 hours this liquor is drained off and combined with the first. The fruit is immersed for the third time in hot water in the ratio of 10 gal. of water to each 100 lb. of fruit and the extraction continued for another period. All three extracts are combined, and the fruit, which by this time should be practically free of soluble matter, is discarded.

The extracts can now be used to leach a fresh batch of fruit in order to build up the soluble solids in the liquid to the desired concentration, or the liquid can be boiled after each extraction until the concentration is around 19 to 21 deg. Brix. This concentration is purely arbitrary, but it represents the range found in the products being marketed at the present time.

Alternate Operation

If treatment of a second lot of fruit is preferred to boiling, the procedure is the same as that previously followed, using fresh fruit and covering it with the required portions of the combined first extracts. In this case it may be necessary to dilute the final leachings, as they are sometimes concentrated to 22 or 24 deg. Brix by this continuous leaching process.

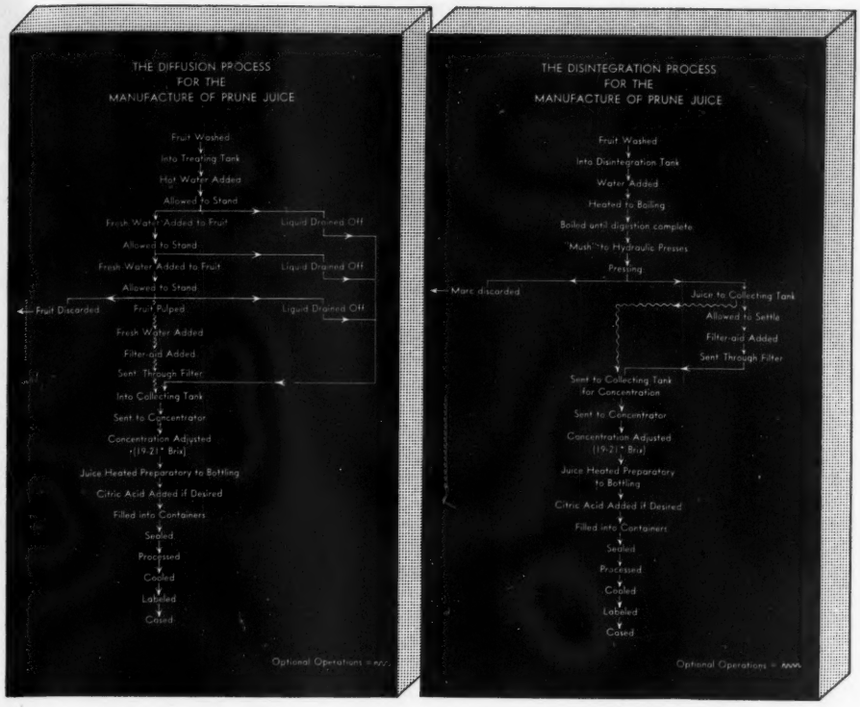
A modification of the diffusion process is to pulp the fruit prior to the last leaching, add a small quantity of hot water and filter the pulp through a special type of coarse bag filter. This procedure adds body as well as fruit fiber to the juice, since the hot water readily extracts considerable pectin from the prune pulp.

The Disintegration Method

For large scale operations, the disintegration method previously referred to has distinct advantages. This process is based upon the extraction of the solids from the dried prune by breaking up the fruit so that the water may have intimate contact with all parts of the prunes.

The fruit is charged into a cooker which is equipped with an agitator and heating unit. The cooker can be either a wooden or metal tank, sufficiently large to allow vigorous boiling. The most desirable piece of equipment for this purpose is a large apple butter cooker which can be sealed and operated under a few pounds pressure, but this is not necessary. For a cooker 6 ft. in diameter and 4 ft. to 5 ft. in depth, a convenient charge of fruit is 1200 lb. The fruit is washed prior to being used and is then placed in the cooker and covered with 700 gal. of water. The water is brought to a boil and the fruit is digested for 60 to 80 minutes, or until it is well disintegrated. If a pressure cooker is available, the time can be reduced 10 to 30 minutes.

The resulting prune "mush" is dropped from the cooker into rack and frame cloths, similar to those used in the vinegar industry but using coarser cloths, and a "press" is built up and subjected to hydraulic pressing in a regular cider press. The material presses easily, the pressure being built up to not over 1000 lb., and the loss of juice and prune solids under these conditions is negligible. The recovered juice, using the fruit-water ratio previously mentioned, should be from 9 to 11 deg. Brix.



These diagrams show the sequence of operations in the two methods of manufacturing prune juice and show at a glance wherein the two methods differ.

The pressed liquor can now be settled and the clear juice siphoned off, concentrated and bottled, or it may be further treated to give a superior product. The further treatment involves filtration of the juice through either a bag type or plate and frame filter, using 1 per cent Super-Cel to aid in the filtration. The brilliantly clear juice can then be concentrated either in open kettles or under vacuum to 19 to 21 deg. Brix. It is then ready for packing.

Processing

When the extract has attained the desired concentration it is heated prior to filling into containers. At this point citric acid may be added if desired. The usual quantity ranges from 0.2 to 0.5 per cent depending upon the degree of tartness the packer wishes to obtain. Such an addition must be declared on the label of the product, the declaration giving both the kind of acid used and the quantity added.

The juice is filled into containers hot, preferable to 180 deg. F. or over, and pasteurized. Pasteurization times will vary, depending on whether the product is packed in glass or tin. For glass containers, Warth has shown that processing of 1 qt. of bottles must be at least 35 minutes at 190 deg. F. to assure a sterile product. Tins and smaller glass containers would require correspondingly less sterilization, depending upon the size and conductivity of the container.

The chief advantage of the diffusion method lies in the fact that it involves little equipment, and that which is required is relatively inexpensive. The disadvantages are the time required in treating a lot of prunes and the relative inefficiency of the operation resulting thereby. Yields are also somewhat lower per ton of fruit, and costs correspondingly higher.

A ton of fruit will yield from 450 to 550 gal. of 20 deg. Brix juice, the yield being somewhat dependent on the quality of fruit available. Average fruit will yield about 500 gal. of juice, ready for packing.

The disintegration method makes possible large scale operations and rapid extractions, with the resulting economies in labor and time. The disadvantage of the method is the additional equipment required. However, it is an ideal process for cider and vinegar manufacturers, as it utilizes equipment otherwise idle for nine months of the year. The finished product has a flavor and body superior to that produced by diffusion. Because of the intimate contact between fruit and liquid, the extraction is more complete and yields of 550 to 650 gal. of 20 deg. Brix juice may be expected, per ton, with average fruit yielding 600 gal. of juice, or an increase of 20 per cent over the diffusion method. This economy, added to the savings in time and labor, permits of a considerable differential in manufacturing and selling costs.

Selecting Raw Material

One important factor which cannot be lost sight of in the manufacture of prune juice is the fruit used in preparing the juices. Good fruit gives a juice superior in color and flavor to that prepared from the smaller or off grade prunes. The best method of purchasing prunes is to buy them subject to specification or subject to similarity to a previously examined sample. A laboratory method for testing prunes has been developed which gives results closely allied to the results obtained in large scale operations.

Upon receipt of the sample, the prunes are checked for size by determining the number of prunes required to weigh one pound. This is the standard method of grading prunes and indicates the relative size of the pieces to be expected in the sample. A visual inspection is made for color, flavor, number of splits, foreign matter and general appearance of the fruit.

One thousand grams of prunes from the sample are washed and soaked overnight in 3,000 cc. of warm water. Next day, the fruit is cooked until disintegrated and the pulp is then pressed in a laboratory type bag press and the juice retained. Then 3,000 cc. of water are added to the marc from the first pressing and the pulp cooked for 30 minutes. The pulp is pressed a second time, the juice recovered and added to that from the first pressing. The volume of the combined extracts is measured and the degrees Brix determined by means of a hydrometer or refractometer. The following equations will then give the percent extractives (A) and theoretical yield (B) of the sample:

(1) Deg. Brix x Volume of Extract x Specific Gravity* $\div$ $10 = A$

(2) $A \times 2000 \div 0.20(9.03) = B$**

* Specific Gravity of sugar solution having same Brix concentration as extract from prunes.
** Yield in gallons of 20 deg. Brix prune juice from each ton of dried prunes.

The theoretical yield obtained by this method has been found to check very closely with the yields obtained under commercial manufacturing conditions on carefully controlled lots of fruit and juice, where the distintegration method was used for extracting the soluble constituents from the prunes. Having determined the probable yield of a lot of fruit, the interpretation of the economy-cost factor for the fruit becomes a simple problem.

REFRIGERATION—Not Freezing
Will Improve Profits in Baking

Part II

By W. E. BROEG*

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Boston, Mass.

APPARENTLY no drastic change is likely to occur for the next few years in the division of volume in the bakery business. Present public response to merchandising indicates that there will still be six types of establishment:

1. Wholesale—manufacturing for resale and restaurant service;
2. Home-to-home—direct delivery to individual consumer;
3. Multiple-unit retail—central plant operated similarly to wholesale, distributing to company-controlled stores;
4. Chain store and restaurant commissary;
5. Small retail store — individually owned bakery units;
6. Supermarkets or large retail—on-the-premises baking.

Refrigeration will play an important role in each type of establishment. In the larger units, "manufactured weather" will be applied generally throughout the entire plant instead of only the present dough room and proofing stages, particularly in large cake plants that now use refrigeration primarily for ingredient storage. "Dough holding" or "dough retarding" equipment is not likely to be applied generally for large wholesale production, except for some specialized items of the high-fat type that are improved with the use of refrigeration.

The home-to-home operator, however, in addition to completely utilizing air conditioning, will find it advantageous to install large refrigerated holding chambers for dough retarding and for finished goods. He will also apply refrigeration with advantage to his rolling stock by a special cold compartment. This will permit merchandising many delicate sales-stimulating, warm weather, perishable items that cannot now be marketed. Using refrigeration for this purpose, he will round out his service to his customers and stimulate volume sales.

Chain store bakeries' application of refrigeration will be practically identical to that of large wholesale plants.

Supermarket bakeries will find it advantageous to install special humidity controlled "dough retarding" equipment. This will permit operating with a fixed, skilled, skeleton crew and thereby cutting labor costs. During the slack days in the early part of the week, numerous items will be made, almost complete and ready, for final baking and finishing and sale on the rush or peak sales days. The failure of these supermarket operators in applying refrigeration to today's problems has been their attempt to adopt obsolete meat refrigerators to the special problem of retarding development of CO_2 in unbaked dough, a problem that requires accurate control of both temperature and humidity.

Many operators of single-unit establishments baking on the premises have already applied special refrigeration equipment as the solution of many of their problems:

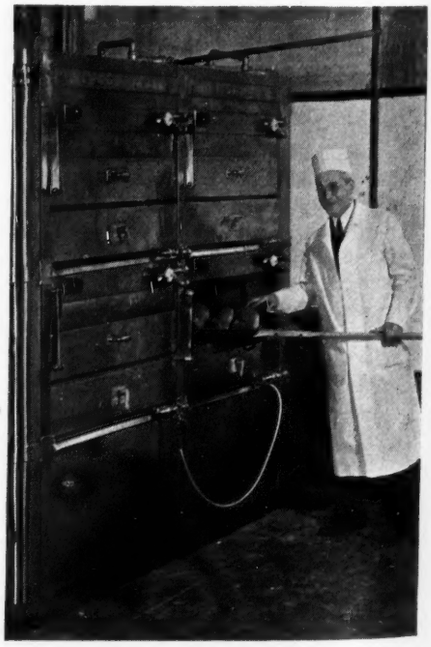
1. The elimination or reduction of stales or unsold goods. The use of the modern refrigerator permits holding perishable items ready to bake as needed. This reduces losses in stales that occur through over-baking many hours ahead.
2. Eliminating or reducing night work that requires part of the crew to start hours in advance of the sales period for the preparation of doughs and the baking of yeast-raised varieties. One important change that the application of refrigeration has brought about in these establishments is the need of more flexible oven equipment.

In the past, baking has been scheduled according to the heat of the oven. Bakers have had (and many still have) one large oven, usually built of brick or heavy masonry that slowly absorbed heat from slow burning fuel while doughs were being mixed and fermented. After firing to heat the oven according to the baker's requirements, fires were shut off, the oven tempered, and baking started. At this time, the oven was at its hottest. Therefore, goods requiring highest temperatures were baked first, regardless of the proximity of the hour of sale of these goods. And all of the items that required a hot oven were baked at one time—usually hours ahead of the sale.

This meant that many items—pies, for example—that were to be sold at noon, and all during the afternoon the following day, were baked at nine o'clock or midnight of the night before, only to become soggy and limp before being eaten. No wonder the public cried for "pies like mother used to bake." What they really wanted was a "fresh" pie. Frequently, an ordinary pie is a good pie if it is "fresh." That was the secret of mother's pies. Many were really inferior, however. But they were fresh baked as needed and that stimulated the desire to eat them.

Today, with refrigeration, pies may be made and placed in these special dough retarding refrigerators, held in the dough stage, and baked all through the sales period. Result—"Fresh pie." This has forced the utilization of either more flexible, single baking chamber ovens or preferably smaller chambered, specially controlled, multiple baking units in tiers and in batteries, side by side. This arrangement permits maintaining any desired oven-temperature all through the sales period. Biscuits and pies requiring 450 deg. F. may be baked in one chamber, while macaroons or kisses requiring 300 to 350 deg. F. may be baked in another *at the same time*—an impossibility with a single chamber oven.

It is evident, therefore, that the re-



This modern oven contains four separate baking chambers, each controlled by thermostat, permitting four different baking temperatures at the same time.

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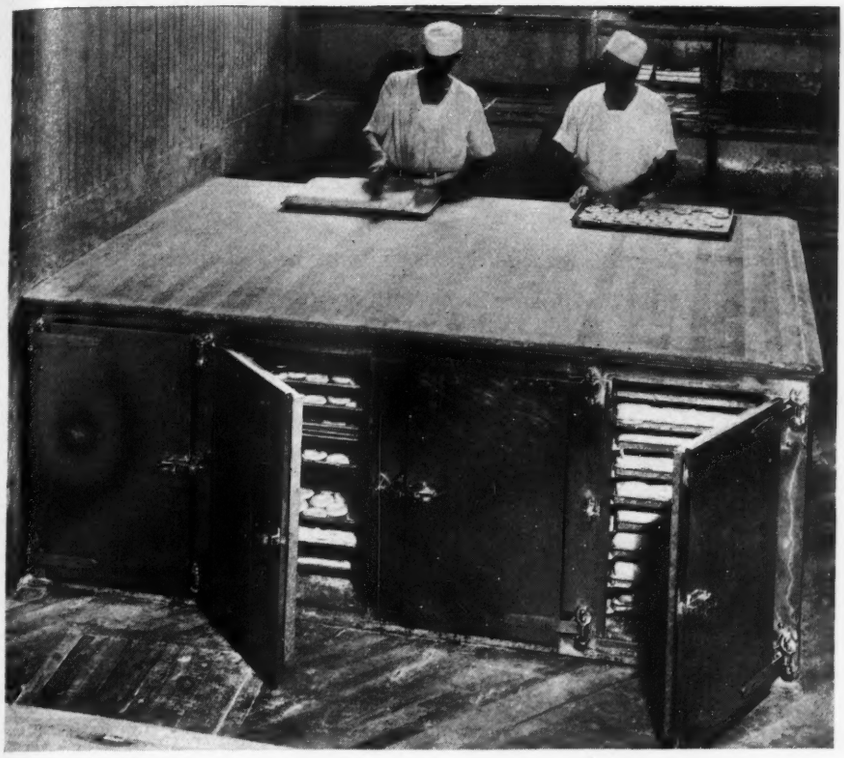


This dough retarding refrigerator occupies space under a table, which would otherwise be wasted.

tail baker of the future needs a smaller multi-chambered, dependable and flexible oven, and a larger humidity- and temperature-controlled refrigerator — just the reverse of the order of a few years ago.

Floor space of 12x12 ft. to 18x18 ft., formerly utilized to house an obsolete single chambered oven, now holds a more efficient, more flexible oven of greater capacity in a space of from ¼ to ½ the former area, thus leaving more room for other equipment or permitting more efficient arrangement in less space or smaller stores.

For the future multiple unit retail operator, special refrigeration equipment will be indispensable. Even with the present central bakery preparation, the development of items improved through the use of refrigeration equipment is unlimited. "Holding" some prepared goods ready for quick baking, finishing and distribution will permit a flexibility heretofore not possible. Even though the present method of distributing completely baked and completely finished products is continued, correct application of refrigeration will improve conditions, and improve the earnngs for the present operator.

The multiple unit retail bakery of the future, however, is likely to change drastically. Several important factors will influence it:

1. The increasing difficulty in obtaining skilled craftsmen to produce quality and variety quickly, because of no organized apprenticeship plan.
2. Increasing demand of the consumer for "freshness" and "variety."
3. Increasing cost and complications of distribution.
4. Increasing costs of bakery labor and the constant demand of labor to abolish night work.
5. The ever-increasing necessity for drastic change in merchandising to catch the fancy of the consumer.

Items 1, 2, and 5 can be coped with by laying the foundation now. Correct handling of item 1 will almost automatically bring about the condition to permit coping with item 2. Item 3 may be out of reach with the present system; however, application of the future plan will automatically adjust item 3. Item 4 can be controlled along with 1 and 2 in the plan of operating the multiple unit bakery of the future.

MULTIPLE unit baking is truly a handcraft art. Within the past few years, compulsory higher education, abolition of child labor, and the dole have replaced apprenticing young people which formerly trained them to become skilled craftsmen. Adjust the educational system to training boys and girls very early in life to handcraft trades, and we will get back the skilled craftsmanship which we have been rapidly losing.

Meanwhile, through the use of a few highly skilled bakers, plus dry blends or semi-prepared mixtures, the application of refrigeration equipment, and a drastic change in distribution and merchandising, we have a sound basis for investment in the bakery of the future.

Refrigerated Dough Process for the Multiple Unit Baker

The multiple unit restaurant or bakery operator could advantageously employ this method of production. Many items, that are best only when served hot, could be made ready for baking, refrigerated, and sent to the retail outlet all ready for quick bake and immediate hot service or sale. In addition to these varieties, many products of the batter and dough types, including pies, could be sent to outlets in the dough stage in refrigerated trucks and baked at the sales room, and sold hot. This is not a visionary dream but a practical possibility which before long will be put into practice.

Equipment manufacturers could realize profits in the making of a combination proofer, refrigerator and oven for the small individual unit store or restaurant, or for the larger multiple unit retail operator who has a chain of retail stores or restaurants.

A small combination work table below which ample refrigeration space could be provided for made-up units, a proofing cabinet, a table top and an efficient small electric or gas oven is all that is needed. This whole unit could be designed as a plug-in or roll-in, easily-installed piece of equipment. It would enable the multiple unit retail operator to install one in a small finishing room, visible to the public, in each of his stores, so that finishing frosted cakes to order, topping meringue pies, baking hot breads, biscuits, and muffins could be done on the premises to create the "Hot Shop" or "on the spot baking" atmosphere. Size of the oven is not the dominant factor in the available output. With proper schedules, a small flexible oven will bake a large volume of "Hot Foods."

Very simple items to make-up such as muffins and biscuits could easily be prepared as needed from dry mixes, or they could be handled in the same manner as "retarded dough," yeast-raised goods made in a central plant. Doughs could be put in small containers that would permit baking in a shipping container that would also become the sales package, or in a combination dough, shipping and distribution container made of heavy paper lined with metal foil. Or, some of the special baking material liners that have been developed recently for pie plates may be used to permit putting the whole

(*Turn to page* 471)

How to Get GOOD LIGHTING

What adequate plant lighting is and how it increases output, improves accuracy and protects the health of workers

By DEAN M. WARREN
Nela Park Engineering Dept., General Electric Co., Cleveland, Ohio

▶Plant managers have come to appreciate the value of good illumination as a means of increasing the rate of production of workers, improving their accuracy and protecting their health. But many managers may not know what constitutes adequate lighting nor how to attain it. Covering these factors as it does, this article is of practical value to

All Food Manufacturers

WITH American industry trying desperately to step up production during the World War, the importance of good factory lighting came to be appreciated. After the usual means of accelerating production had been applied, someone thought of more light. Every test brought the same result. The more light the more production. And surprising to many, cost of the additional lighting was considerably less than the value of the increased production. And thus came the 10 to 15-foot candle era of general lighting—the era of decreased production cost, less spoilage, fewer accidents and better plant housekeeping.

This practical experience demonstrated that workers are helped by better lighting. But laboratory tests have gone further. They have proved that workers with poor eyes are helped more than those with better vision. In one experiment, the production of the former was increased by 22 per cent; that of the latter, by 14 per cent.

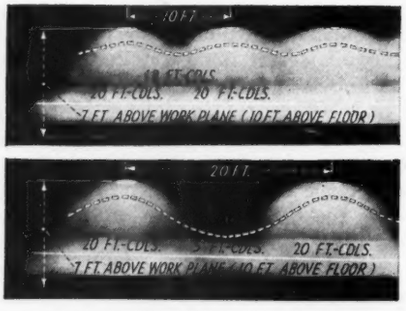
Adequate lighting implies not merely light in sufficient quantity, but light of a quality that makes seeing as nearly effortless as possible. Where lighting is very spotty, with extreme contrasts between bright and dim areas, it generally causes eye strain and makes continued vision difficult. Spotty illumination may result from incorrect spacing of the lighting units, the wrong type of lighting equipment or the use of supplementary lighting with no general illumination.

Harsh, dark shadows constitute an accident hazard because they frequently obscure objects that should be seen. Shadows lower production and are likely to cause errors in operation. Shadowy interiors hide dust and dirt, thereby affecting plant maintenance. Shadows may be caused by inadequate diffusion of light, the wrong type of light sources or their incorrect placement, or an insufficient number of sources.

Glare is another factor deserving major attention. It is not comfortable to look at the sun when it is high in the heavens nor a sheet of water glistening in the summer sunshine. In looking at the sun, direct glare is encountered. In looking at the water, reflected glare is experienced. Both are uncomfortable and one instinctively averts his eyes. But the worker cannot take his eyes off his work. He must look at it even though the bare bulb dangling at the work location is uncomfortably bright. Glare may result from the use of the wrong type of lighting equipment, the use of the wrong type of lamps, inadequate diffusion of light or improper location of the equipment.

There is no danger of obtaining too much light under properly applied modern sources of artificial lighting. This is apparent when we compare the 3 to 5-foot candle average indoor values with 5,000 to 10,000 foot candles of outdoor daylight.

The eye will function and distinguish objects under lighting of less than 1 foot candle. But to avoid premature aging of the eyes and needless expenditure of nervous energy, there must be more light than just enough for seeing. Today this can be had economically. The cost of energy, equipment and lamps has been decreasing constantly, while efficiency has materially increased. The lighting dollar now purchases ten times as much as it did 25 years ago and twice as much as 10 years ago.



This shows what happens to uniformity of illumination when the lighting units are spaced too far apart.

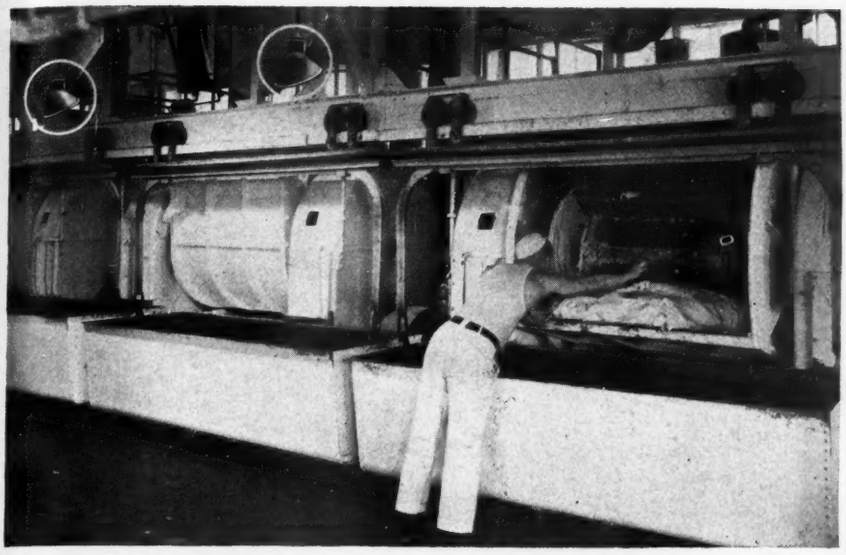
To take an example of the requirements for adequate lighting in the food industries, the following intensities are recommended for baking plant operations:

Operation	Foot Candles
Bakery operations	20
Cleaning, grinding and rolling	10
Baking or roasting	20
Flour grading	30

These foot-candle values are extremely conservative when compared to the values found outdoors.

The human eye is not concerned with measuring, but with seeing. For this reason it should never be depended upon to measure the amount of illumination available for any seeing task. Guessing is eliminated by using a light meter. But even the meter will not tell whether the lighting is of the proper quality. Such an appraisal should be made by one skilled in lighting analysis. It includes such factors as glare, reflected glare, diffusion, shadows and direction of light.

Selection of proper reflecting equipment is more important today than at any time in the history of illumination. The standard RLM dome reflector is satisfactory where explosive dusts are not present. This reflector is the standard product of a large number of manufacturers and is made according to rigid specifications which insure its effectiveness. It is recommended for use with white bowl



To adequately illuminate these 2,000-lb. dough mixers, the light is directed from a point above and in front by angle reflectors, two of which are shown in white circles.

when it carries 15 amp. only 25 ft. This has not prevented the extension of such circuits to runs of 100 ft. or more with resultant losses far greater than they should be. It is considered good practice to limit each 15-amp., 115-volt branch circuit to an initial load of not more than 1,000 watts, to use no wire smaller than No. 12, or in certain cases, No. 10, and to allow no branch runs to exceed 100 ft. to the first outlet.

No matter how carefully designed a lighting system may be or how well it is maintained, if the surrounding walls and ceilings do not reflect a good percentage of the light striking them, the system will be inefficient. Frequent painting and a good maintenance schedule insure efficient utilization of the light and promote cleanliness. Repainting every few years can be justified from an economic point of view. It cannot, however, be placed entirely on a dollars and cents basis. Environment plays such an important part in the productiveness of the employee that repainting should really be done whenever the interior appears dirty.

lamps. A glass cover plate aids maintenance.

For locations where explosive dusts are present, two types of protective units are available: dust-tight and vapor-proof. Vapor-proof units are designed for protection from explosive vapors as well as dusts and are suited to extra hazardous locations. In dusty atmospheres, the dust-tight units are entirely safe.

The first consideration in planning an artificial lighting system is to provide a reasonably uniform level of general lighting throughout the interior. Such lighting not only eliminates spottiness, but also enables the utilization of every square foot of floor space. Since most work surfaces are from $2\frac{1}{2}$ to $3\frac{1}{2}$ ft. above the floor, the spacing may, for practical purposes, be considered a function of the mounting height of lamps above the floor. In general, a spacing in feet which does not substantially exceed the mounting height will result in reasonably uniform illumination.

Although general lighting is a satisfactory solution for many of the seeing problems found in the food industries, any plan of general lighting will encounter obstacles which will obstruct the light and prevent it from reaching important and vital points. So supplementary lighting must be applied wherever required.

Mazda lamps are very sensitive to voltage conditions. A change of 1 per cent in the voltage delivered at the lamp socket changes the output of an incandescent lamp about 3 per cent. And a 5 volt drop results in the loss of about 16 per cent in light output.

Good mill practice requires that the grinding rolls be accurately adjusted. This requires not only experienced judgment but good light, such as is available in this mill.

In the past, practically all branch circuits for lighting have been No. 14 wire. Although this wire size can carry 15 amp. safely, it cannot do so economically for any considerable distance. A drop in a branch circuit of No. 14 wire will reach 2 volts

In the pork-cutting department, fat backs and other lard-producing portions of the hog carcass are trimmed from the cuts marketable as fresh or cured meats. Leaf lard is stripped out of carcass on the killing floor.

What About Lard?

Can it regain its former first-place position as a general purpose shortening?

By

L. M. TOLMAN *and* **G. A. CRAPPLE**

Research and Technical Departments
Wilson & Co., Chicago, Ill.

FOR some years there has been a steadily rising tide of questions asked about lard. Midwestern farmers want to know what is wrong with lard. Packers have questioned what can be done to improve lard to the point where it can compete with the best grades of vegetable shortening. Should lard be considered as a raw material needing further processing, is a question often asked. An editorial in the May, 1939, issue of FOOD INDUSTRIES simply asks "What About Lard?" and focuses the attention of producers and packers alike on the problems concerning this basic product of the farm, the market value of which profoundly affects the well being of the entire Midwestern agriculture.

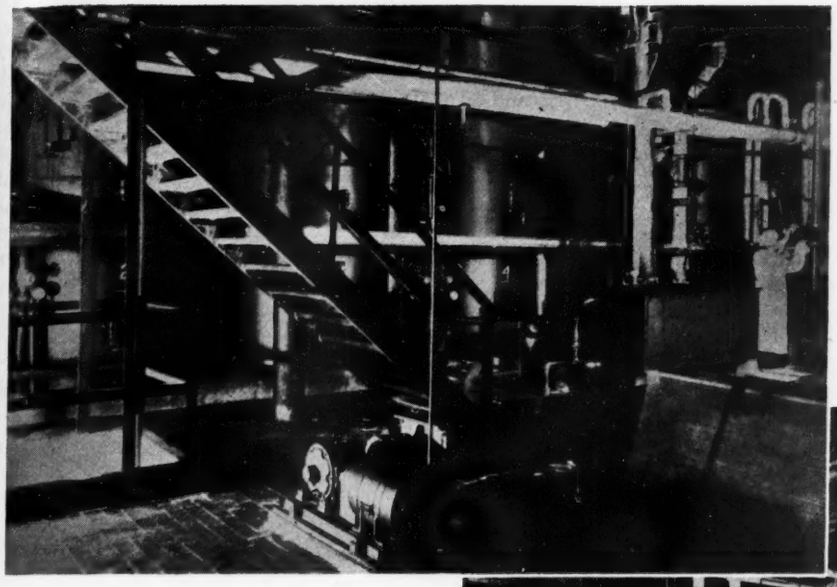
One might with some justice ask why all this questioning of the value of lard, since lard from time immemorial has been the standard shortening of the home. Why, in the face of the acute shortages of some few years ago, should lard now be a drug on the market? A study of the situation shows that it is in the small package household trade, especially in the urban areas, that lard has lost ground.

NATURAL ADVANTAGES of lard as a shortening, protected by new methods of manufacture and packaging that assure a uniform product of highest quality, and wider knowledge of the uses of lard, now permit a promotional emphasis of its virtues.

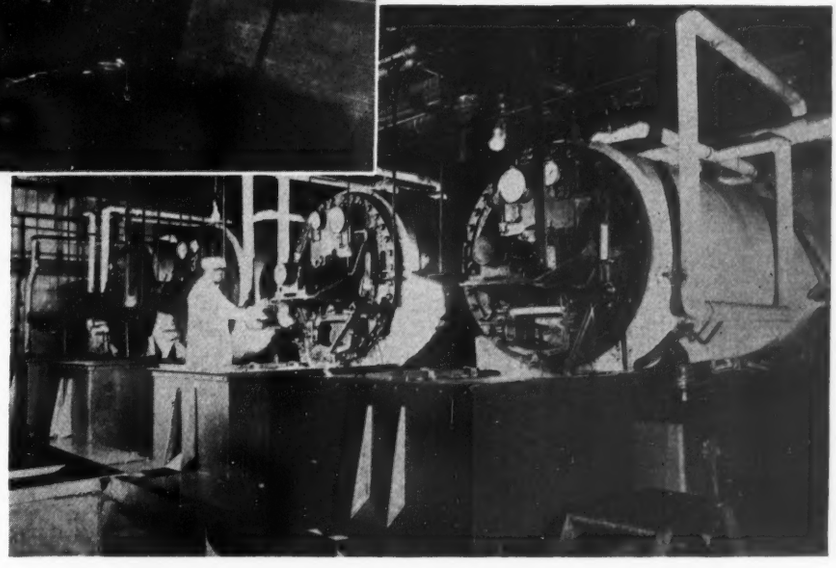
This has happened largely because lard has been displaced as a household shortening by so-called lard substitutes: first, because of declining production of lard over a period of several years; second, because of the aggressive merchandising and advertising tactics of some of the producers of hydrogenated vegetable oil shortenings; and third, because the lard producers have been slow in adjusting their product to the changing quality demands of the housewife.

The great variation in lard production in the last eighteen years is illustrated in the graphs shown with this article. Total lard production, B.A.I. inspected production, exports of lard, wholesale price of refined lard and the per capita consumption of lard and vegetable shortenings are purposely plotted on the same sheet. You will notice that lard is displaced by vegetable shortenings only when lard is scarce and the price high. Opposite the peaks in lard production invariably occur valleys in the per capita consumption curve for vegetable shortenings. Similarly, peaks in lard consumption are found when lard is plentiful and cheap. It should be further noted that exports follow the production curve very closely. Of course, exports of lard have been adversely affected by the world fat market and the economic situation in Europe, but it is interesting to note that coincident with the recent increase in the production of lard, there has been some increase in the export of this product.

Obviously, all of the lard produced is used, and practically all is used as shortening. The disposition of lard is no problem. The difficulty is to obtain a fair price for this basic farm product. Because the price of lard



Prime steam lard results from live steam melting of hog fat in large vertical tanks. Melted fat is decanted into settling and cooling vats preparatory to blending, filtering, and packaging as lard.



In making lard by dry rendering of hog fat, vacuum is applied during the last part of the melting period. Melted fat is drawn off and cracklings are dumped from melters onto metal screens for draining before being dropped onto conveyor to feed hopper of expeller presses on floor below.

is reflected in the price of hogs, and indirectly in the price of corn, low lard prices are a cause of worry not only for the packers, but for the entire agricultural Middle West. Our problem then is the maintenance of a fair price for lard in the face of a return to normal production.

Let us consider what happens in a period of increasing lard production, such as now exists. There is an immediate over supply and the price drops. The bread and cracker bakers who prefer lard when the price is in line take up the surplus. There is no corresponding increase in small package household consumption, because the housewife forms more stable buying habits and does not react so promptly to price relationships. The result is that the baking trade, which absorbs the surplus lard, can purchase it at an abnormally depressed price.

Why is the housewife now using lard substitutes in preference to lard? In our opinion this is chiefly because, in periods of high lard prices, the vegetable shortening manufacturers were able to convince the housewife: first, that their shortenings were as good as lard; and later, by aggressive advertising tactics, that their products were superior to lard. They have nursed this impression along by presenting their products in more attractive containers.

We see then that the lard substitutes have developed to fill the gap between lard production and lard demand. These shortenings were originally composed of oleo stearine and cottonseed oil; later, of hydrogenated vegetable oil stearine and cottonseed oil; and, more recently, of partially hydrogenated vegetable oil. In the earlier days, these fats were of inferior quality and a great deal of research and development was required to make them at all comparable to lard. Even today, most of the lard substitutes are decidely inferior to lard as general shortenings. The research laboratories of the large shortening manufacturers have, however, developed partially hydrogenated vegetable oil products which have captured a large part of the household shortening market. This has also required a tremendous advertising effort.

UNFORTUNATELY, during the period when the manufacturers of vegetable shortenings were winning the housewife away from lard, packers failed to defend their household lard business by extensive advertising. The lard producers must now make up for lost time by calling the attention of the public to the improvements made in lard in the past few years and to the good qualities that lard has always possessed. This is necessary, not only to regain for lard its lost prestige, but also that it may hold its own in the highly competitive retail market.

We have shown how lard has lost its position as a household shortening to the vegetable oil shortenings during periods of low production and high prices, and how the vegetable oil people have held their advantage by dint of constant advertising and research effort. The same aggressive merchandising and advertising methods that have put over the vegetable shortenings should be useful in reinstating lard as a household shortening. First, the product should be maintained at the highest plane of excellence; and second, the superior quality of lard should be brought to the attention of the housewife through advertising. The first step can be largely accomplished by the practical application of principles well known in the industry.

What do we, the processors and sellers of lard, have to tell the housewife about lard? For a starter, let us discuss the question of digestibility. In spite of the inferences gained by the housewife from the advertising material of some shortening manufacturers, lard has certain definite advantages over vegetable shortenings. It is a well known fact that all fats are highly digestible and that the ease

of digestion is largely a matter of melting point. In actual tests, lard has been found to be 97 per cent digestible, which is about equal to the digestibility of butter and is slightly better than that of partially hydrogenated vegetable oil. Lard has the added advantage of being practically liquid at body temperature, a boast that cannot be made for partially hydrogenated vegetable shortenings. Proof of the misleading effect of certain advertising copy is the fact that a great many people have been convinced that lard is not digestible and will not use it for that reason.

Lard is a natural fat—nothing has been added and nothing removed. As a natural fat, lard has nutritive values not possessed by partially hydrogenated vegetable oil. Lard contains an adequate amount of linoleic acid. Burr and his co-workers at the University of Minnesota have shown that this fatty acid cannot be synthesized by the body and that it must be supplied in the diet. They have also shown that if linoleic acid is absent from the diet, deficiency diseases will occur which can only be cured by feeding linoleic acid. Now, it has often been proposed that lard be refined, bleached, hydrogenated, and deodorized, a treatment which would convert lard into a shortening very similar to the hydrogenated vegetable oil shortenings. Such treatment destroys not only the linoleic acid and any vitamins present, but also lard's fine distinctive flavor.

THE question—to hydrogenate or not to hydrogenate—is an interesting one and one worthy of elaboration. The hydrogenation of vegetable oils was developed to convert the liquid oils to lard-like products. Incidentally, it was discovered that this treatment increased the stability of the oil. No one would think of hydrogenating lard except to increase its stability. Hydrogenation increases the stability of fats by converting the easily oxidized linoleic acid to relatively stable fatty acids. To put it another way, linoleic acid, a nutritionally valuable substance, is destroyed to make the fat more resistant to the development of rancidity. Obviously, the lower the linoleic acid content, the more stable will be the fat.

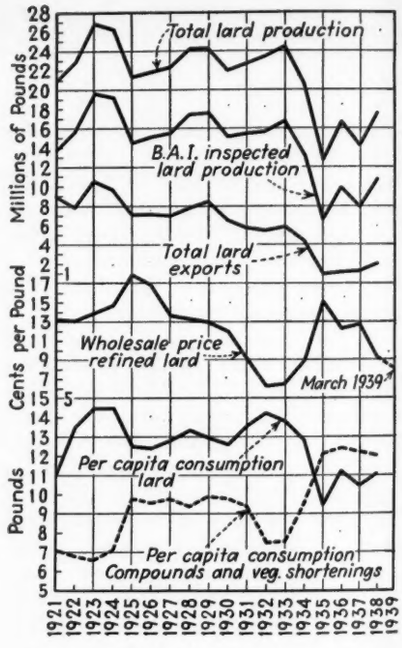
The direction that the manufacturers of hydrogenated vegetable shortenings have taken is towards lower linoleic acid content. This is understandable since the hydrogenated vegetable shortenings must be stored at room temperature in order that they have the proper working properties. If a fat is to be stored at room temperature it must have great stability. Fortunately, lard is plastic and workable at refrigerator temperature, and properly prepared and handled lard may be held for months under refrigeration without developing off flavors. What particular advantage would be gained in extending its shelf life to years especially when this can only be done at the expense of its nutritive value?

We are opposed to the destruction of the nutritive properties of lard in this manner. We believe that the over refinement of foods should be avoided. There is the classical example of the polishing of rice, which process improves the appearance of the rice, but the vitally necessary vitamin B_1, the anti beri-beri vitamin is removed.

Lard is composed of a mixture of liquid and solid fats which gives it many desirable properties, not the least of which is a wide plastic range. This means that lard is workable over a wide range of temperatures and is even workable directly after being removed from the refrigerator. The mixture of fats also gives lard a long melting range. Thus, while lard has a melting point, as determined by the Wiley method, almost as high as other solid shortening, it begins to melt at a lower temperature and is practically liquid at body temperature, a property which insures its rapid digestion.

Perhaps lard's excellent shortening value also results from this unique mixture of fats. It can be demonstrated readily that, of the solid shortenings, lard has the greatest shortening value, being about 30 per cent better than the hydrogenated vegetable oil shortenings. By shortening value we mean the ability to impart shortness to baked goods. Shortness is measured by the force necessary to break a standard cracker or pie crust. Thousands of tests made in the Institute of American Meat Packers' laboratory and in other laboratories, have proved the superiority of lard in this respect. Practically, this means that lard makes flakier, more tender pie crust, lighter biscuits and better bread. It is also possible to make flaky pie crust with one-third less lard than hydrogenated vegetable shortening, an additional economy connected with the use of lard.

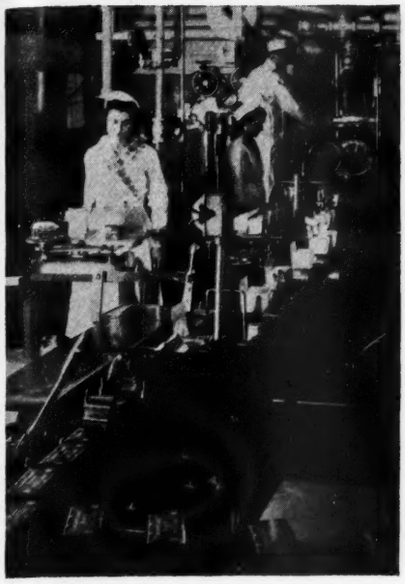
Butter has always been and still is the accepted household cake shortening and it has only been in recent years that the vegetable shortenings have been considered for this purpose.



When lard production decreases, lard prices rise and per capita consumption of lard falls off, its place being taken by vegetable shortenings.

Calendar Year	B.A.I. Inspected Lard Production	Total Lard Production	Total Lard Exports	Average Wholesale Price Refined Lard In Cents	Apparent Per Capita Consumption Lard	Apparent Per Capita Consumption Compounds & Vegetable Shortenings
	1,000,000 lb.	*1,000,000 lb.*	*1,000,000 lb.*	*Per lb.*	*lb.*	*lb.*
1921	1,379	2,092	893	13.21	11.1	7.1
1922	1,575	2,283	787	13.07	13.5	6.8
1923	1,971	2,692	1,060	13.90	14.5	6.6
1924	1,923	2,635	971	14.65	14.5	7.1
1925	1,452	2,133	708	17.90	12.5	9.8
1926	1,513	2,185	717	16.91	12.4	9.6
1927	1,557	2,240	702	13.66	12.8	9.8
1928	1,750	2,432	783	13.30	13.3	9.4
1929	1,763	2,435	848	12.97	12.9	9.9
1930	1,521	2,201	656	12.02	12.6	9.8
1931	1,554	2,279	578	9.02	13.5	9.4
1932	1,573	2,351	552	6.25	14.2	7.5
1933	1,679	2,446	584	6.42	13.8	7.6
1934	1,341	2,072	435	8.84	12.8	9.5
1935	662	1,267	97	15.07	9.4	12.1
1936	992	1,673	112	12.20	11.2	12.4
1937	787	1,434	128	12.67	10.5	12.2
1938	1,076	1,765	205	9.20	11.1	12.0
		March 1939.	.....	7.52		

Source of Statistics — United States Department of Agriculture.



Lard becomes a finished product for retail market trade when measured into cartons lined with lard-liner vegetable parchment, sealed, and solidified.

Lard has not been generally used as a cake shortening and this has perhaps reacted against the use of lard as a general household shortening. We have made a thorough study of the use of lard in cakes and have proved that excellent cakes can be made with lard. Our Bakery Research Laboratory has developed recipes that are simpler than most cook book recipes, but which produce very high quality cakes. These cakes, while slightly smaller in volume, have better eating and keeping qualities than have cakes made with hydrogenated vegetable oil shortenings. Volume in cakes is a very much overrated virtue.

After all, butter cakes have less volume than hydrogenated vegetable oil cakes, but no one would prefer the latter to the former. We have found lard cakes to be very similar to butter cakes.

The flavor of properly rendered and handled lard is distinctive and highly desirable. This is to be expected, because lard is made from pure fresh pork fat taken from animals used for human food and handled with the greatest care under Federal inspection. Such fat is no different from the fat in bacon or pork chops and the much relished flavor of these products is largely associated with the fat.

We see then that lard has many virtues that recommend it as a general household shortening. If we impress the housewife with these superior properties of lard through advertising, and if the advertising is backed up by a uniformly high grade product, we feel certain that lard can be reinstated as the principal household shortening. The production of a uniformly high grade lard is the phase of the problem that particularly concerns the technical staffs of the meat packers, and the remainder of this paper will be given over to this problem.

A high grade lard must be uniform from day to day. It is impossible to build up a high grade business on a product that varies in its properties. When we speak of uniformity, we mean that the lard must be uniform in melting point, consistency, color and flavor, have a uniformly low free fatty acid content, and have a uniformly high stability. Unfortunately, the production of a uniform lard is no simple problem, but it can be done with the aid of thorough laboratory control.

The fats from which lard is made, as they exist in the animal, are neutral and of good color. The problem of rendering is to separate the fat from the tissue without changing its properties. Fat splitting enzymes become active as soon as the animal is killed, so the maintenance of low fatty acid content depends on the quick handling of the fats between the killing floor and the rendering equipment. Of course, proper rendering conditions must be maintained, but these conditions are well known to the industry. Proper handling and rendering will also result in a lard of uniformly good color.

THE problem of adjusting melting point and consistency to a standard presents more difficulty. Lard is rendered from fats from different parts of the animal, which vary greatly in melting point. The layer of fat next to the skin has a very much lower melting point than leaf lard. There is also some variation between animals. We have explained before that the fact that lard is a mixture of soft and hard fats is responsible for many of its desirable properties. It, however, makes it necessary to blend different fats carefully to maintain a standardized melting point. Considerable practice is required before this can be done with any degree of success, but after the operators become expert, melting point (Wiley) can be maintained within 0.5 deg. C.

Uniformly high keeping qualities can be maintained by an intelligent application of known principles. Nothing needs to be done or added to the lard. It is only necessary to retain the stability of the fat as it exists in the animal. Constant laboratory check throughout the process is indispensable here. The keeping quality of high grade lard is such that it can be stored at temperatures below 60 deg. F. for many months without showing signs of deterioration.

HAVING produced a high grade lard by rapid and sanitary handling of fats, efficient rendering, and careful handling of rendered product, it remains to chill and package it. The consistency of the finished product can be greatly affected by these operations and, unless they are standardized and a strict laboratory control set up, a product of varying consistency will result regardless of the uniformity maintained up to this point.

Practically all packaged lard is sold in the familiar economical carton, which is very similar to the butter carton, and which should be handled in the same manner. The lard carton can be made more acceptable to the housewife. We refer in particular to more careful filling. Every effort should be made to prevent lard from coming in contact with the outside of the liner. It should be possible to remove the liner smoothly from the lard, in order that the housewife may store the lard in a refrigerator dish should she desire to do so.

Our answer to the question "What about lard?" is contained in the statement that the rising production of lard should be absorbed by the kitchens of America. We believe that, when the superior qualities of lard are made known to the housewife and when she is supplied with a uniformly high grade product at a saving over the best of the hydrogenated vegetable oil shortenings, she will unquestionably use more lard. Wilson & Co. is so sure of this that it has made a considerable investment in new plant equipment, research and laboratory control, and has inaugurated an extensive and aggressive advertising program. We have placed on the market the new Wilson Certified Pure Lard, which is the highest quality, most uniform lard that can be made on a production basis. We consider this lard to be the general shortening without a peer. When used for frying it will not smoke up the kitchen. It will keep indefinitely under refrigeration. It makes the finest pie crust, biscuits, bread, cookies and cakes. It is reasonably priced. We are certain that the housewives will prefer this lard to vegetable shortenings once they become familiar with its superior properties.

More Mistakes To Avoid in Packaging

PART VI

EDITOR'S NOTE: ***This series will run for several months until it is completed***

EVERY EXAMPLE is based on actual errors of packaging. Publication of the negative aspects of packaging is frequently more informative than the mere statement of a bunch of rules to follow. Particularly is it important to bring out the reasons why, and the automatic penalties that develop because of making mistakes.

202 **Failure to Use Space to Advantage**—Many packages that are on the market repeat the main display panel, front and back. And apparently it is taken entirely for granted that the consumer is thoroughly familiar with the advantages of the product and the methods of its correct usage. This shows a lack of marketing knowledge which at times causes us to wonder how some manufacturers succeed, in view of the violations of good packaging principles to which they cling so tenaciously.

203 **Marketing FACTS Come First**—Thousands of packages on the market today are glaring examples of the fact that manufacturers are content to place the design of their packages in the hands of a commercial artist *before* rather than after doing the more intelligent job of first finding out the marketing facts and then helping the artist to interpret these facts in terms of package design.

204 **Ill Considered Packaging Changes**—A packer of food products in bags listened to the complaint of his packing foreman that the girls were taking too long in filling the shipping cases. The packing foreman was given the blanket order to make any changes he felt necessary to speed up the operation which included, when later discovered, a considerable enlargement in the container itself. Millions of packages were produced before reports filtered back from retail stores that packages were received in terrible condition, some badly broken and others scuffed beyond recognition. Naturally, the shipping container was the last to receive attention because it was always received without evidence of abuse. The final step was to return to a snug, closely fitting shipping container, thus preventing danger of shifting, abrasion, and the breakage of the contents.

Moral: Do not make changes in established packaging procedure without detailed investigation.

205 **False Economy on Carton Stock**—Sometimes, in an effort to effect an economy, a manufacturer will try to use cartons made of too light a board for successful use on automatic sealing machines. Such light weight material causes difficulty in opening the cartons on the automatic feeders, and in handling the carton through automatic top-and-bottom sealers, with resultant high spoilage. Also, with too light a cardboard, it is frequently impossible to secure proper pressure in the dryer for sealing the cartons. Under the latter conditions the cartons collapse, resulting in poor sealing and high spoilage.

206 **Improper Choice of Closure**—The improper selection of the best closure for a given food product may result in poor sales. This unfortunate choice may come about from the human tendency to use what is at hand rather than to select a container and closure that are suited to the needs of the pack and its usage.

207 **Packages Breathe if not Air Tight**—A package will breathe if it is not air tight. This refers particularly to paper packages, for tin and glass packages are usually air tight. Nevertheless the latter can be so constructed that they will breathe if that characteristic is needed.

The term breathing is a bit of technical jargon and refers to the movement of air into and out of packages as a result of changes in the relative pressure of the air outside the package. This may be caused by natural changes in the barometric pressure, or by shipment from low altitudes to high altitudes or vice versa, or by purely artificial methods for experimental purposes.

A very open type of package is usually regarded as ventilated, although the breathing phenomenon can take place there with equal ease.

During the World War period, when paper gaskets were used in tin cans of the "packer's" type, breathing through the gasket was occasionally noted.

208 **Failure to Sterilize Crowns**—A relatively common mistake is to use crowns or other caps on jams, preserves or syrups without sterilizing the caps. Crown caps contaminated with mold are a prolific cause of spoilage in these products, especially syrups and honey. One company actually went bankrupt for this reason.

209 **Ineffective Closure Liner**—This company packed vinegar in glass under a cap having a liner made from small pieces of cork pressed together with an adhesive material to form a "cork composition." Acetic acid in the vinegar attacked the binder in the cap liner, the "composition" fell apart, and the seal was broken. Without this protection, sterile conditions no longer prevailed in the package and the product soon showed cloudiness in the form of a growth of "mother." Moreover, the vinegar now had access to the metal of the cap. This was attacked by the acid and became etched and unsightly. In some cases the caps were even eaten entirely through. The product, of course, soon became contaminated with metallic salts which adversely affected its flavor and wholesomeness.

Too little experimentation and testing were responsible for this package error. The action on these caps proceeded rather quickly and the whole trouble would have been avoided had the manufacturer held the product under a short experimental storage before shipping it. Nevertheless, some blame should be attached to the cap manufacturer who should have known that these liners would not resist the attack of acetic acid.

210 **Loose Solder in Cans**—A plant operator received complaints from his customers that his fluid products contained small loose pieces of solder. The product was one which was filled into cans through small openings or vents which were later to be sealed with solder. Upon investigation it was found that the temperature of the solder at the time it was run into the vent was too high. This caused droplets of solder to fall from the underside of the vents into the can. Keeping the solder at the proper temperature obviated the trouble and the complaints.

211 **Overfilling Liquids**—Here is a case where the bottles were filled too full of a fluid product (milk). Customers complained that the closures came off the bottles, and that the bottles were messy. Upon investigating these complaints, it was discovered that the filling valves were improperly adjusted, with the result that too much product went into the containers. And this resulted in failure of the closures to seat properly. Later they became loose and allowed the product to mess up the outside of the bottles. Proper adjustment of the valves obviated these complaints and likewise saved wasted product.

212 **Installing Machines to Fill Powders**—Partitions around equipment that mixes and packages powdered foods are unnecessary, serving only to obstruct light and ventilation. This equipment can be operated without dust if adequate means of dust collection are installed, so that each machine is, in effect, surrounded by an upward moving column of air. For example, a southern food manufacturer installed powder filling equipment in an area adjacent to another process. The installation was made in a hurry, with the thought of placing partitions around the new equipment later. But it was found that, with the aid of a small dust collector, these partitions were unnecessary, as the food in the adjacent area was not contaminated.

213 **No Outage (Head space)**—When filling a barrel through the bung hole, there should always be some space left for outage (head space—Ed.), so as to eliminate internal pressure. The barrel should not be filled right up to the end of the bung stave.

214 **Errors of Paraffin Heat Sealing**—Bread wrapping machines are very intricate and, when in proper adjustment, do a good job. However, if care is not taken to keep the adjustment in perfect condition, they can show a fairly large number of rewraps. Where heating elements are needed as in the case of paraffin-sealed wrappers, if there is not some automatic cut-off on the electric heaters, they can easily become much too hot during waiting periods between wrapping activity. There should be some type of thermal regulation on the heaters so that they cannot become overheated.

In very hot weather it can happen that the paraffin remains so soft that the seal re-opens. It has been found of advantage to cool the ends of the bread by having the conveying belt in contact with cooling tanks.

It is very important to realize that when a machine is in adjustment for one type or weight of paper, that it may not do so well if the wrapper stock is changed to some other type or weight without making appropriate readjustment.

215 **Revenue Stamps on Wet Metal**—When we commenced using metal cooperage for beer, we encountered considerable difficulty in affixing the necessary revenue stamps to the metal package. Paste which was satisfactory for wood would not stick to metal. To locate the proper paste was not easy, for it must adhere not only to metal but to *wet* metal. Refrigerated storage does not dry out readily.

216 **Key-Opening Cans That Break**—No more needless error of packing ever occurs than the use of an ineffective type of scoring for key opening cans. A type of scoring that never fails will cost but a trifle more than the straight line scoring which usually can be counted on to break before the can is open. Also to lose customers for the food manufacturer, if friend husband is called upon to assist his hapless wife.

217 **Traffic Department Misses Bet**—A large shipper of corrugated boxes felt that he had an excellent knowledge of these containers. Also that his traffic department was all up-to-date on all freight regulations. But changes in container regulations come along about every thirty days, and it was found that the traffic department was far too busy with its own problems to keep abreast of the continual changes. A survey by a specialist in this subject was permitted and he was able to point out a number of new changes of traffic regulations by which it was possible to improve and lower the cost of the company's shipping methods.

218 **Check Glass Container Tolerances**—Tolerances established by the Glass Container Association for the manufacture of glass containers, unless carefully checked, are sometimes disregarded by container manufacturers. When the food packer is not using high speed machinery and the containers as delivered have not been closely sorted, no trouble results. But when high speed equipment is used, minor variations cause much trouble. Consequently, many food packers specify tolerances much closer than those of the Glass Container Association, even at some additional cost. Avoidance of breakdowns caused by irregularities in glass warrants even a very substantial increase in the price of glass containers, so that they will be gaged within rigid tolerances.

To illustrate, a food company in Philadelphia which recently installed automatic lines, found that it was almost impossible to use the glass containers which it had in stock. This was because of variations in shape and dimensions that caused continued interruption in the operation of the packaging lines.

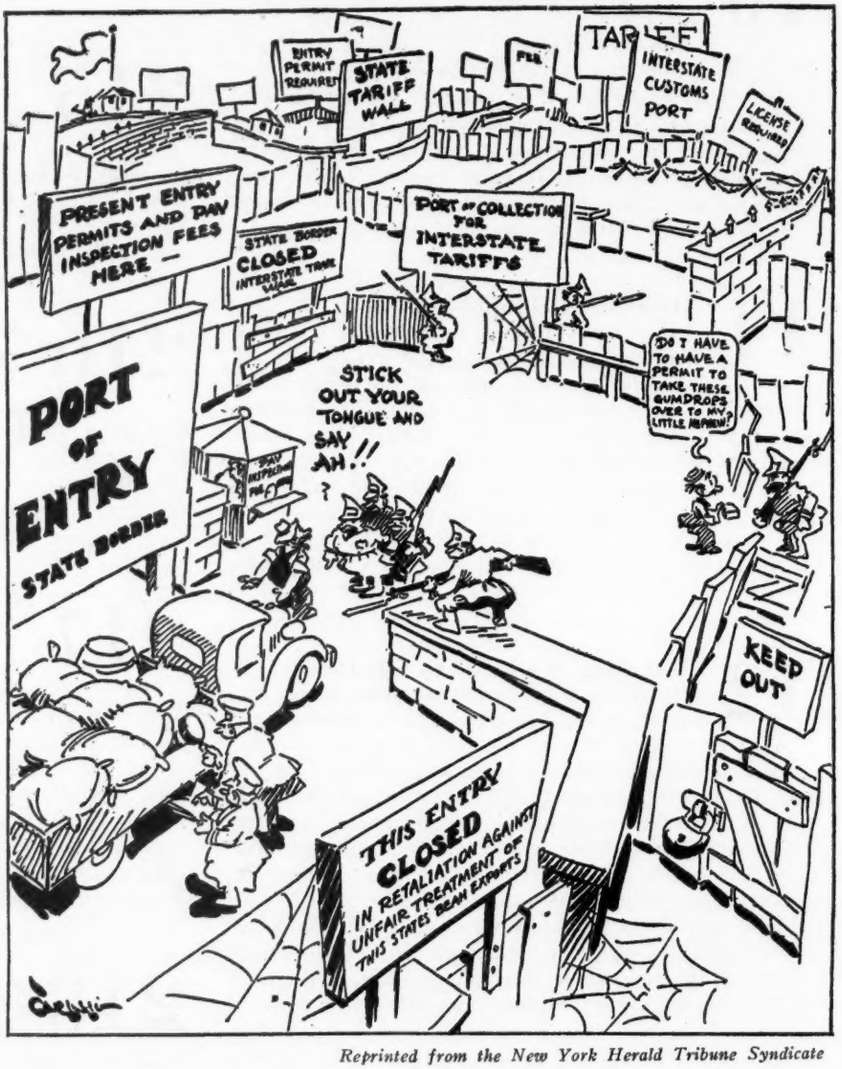
State Regulations *Steal Food Markets*

By IVAN C. MILLER
Distribution Editor, FOOD INDUSTRIES

PUBLIC RELATIONS IN THE *Food Industries*

This is the second article in a series dealing with the effect of state trade barriers on the distribution of food products, pointing out the food manufacturers' need for better public relations.

These Dis-United States


ENTRY PERMIT REQUIRED
STATE TARIFF WALL
INTERSTATE CUSTOMS PORT
LICENSE REQUIRED
PRESENT ENTRY PERMITS AND PAY INSPECTION FEES HERE
STATE BORDER CLOSED
PORT OF COLLECTION FOR INTERSTATE TARIFFS
PORT OF ENTRY STATE BORDER
STICK OUT YOUR TONGUE AND SAY AH!!
DO I HAVE TO HAVE A PERMIT TO TAKE THESE GUMDROPS OVER TO MY LITTLE BROTHER?
KEEP OUT
THIS ENTRY CLOSED IN RETALIATION AGAINST UNFAIR TREATMENT OF THIS STATE'S BEAN EXPORTS

Reprinted from the New York Herald Tribune Syndicate

IN the 1935–1936 Yearbook of the South Carolina State Department of Agriculture, pages 64 and 65, appears the following: "In the grocery stores of South Carolina, you will find signs reading 'Shipped Eggs', 'South Carolina Eggs', and in some instances, 'Cold Storage Eggs'. These signs are placed on cases containing eggs in compliance with the South Carolina egg law. The law was designed for two purposes: first, to indicate to the purchaser the quality of the eggs on sale; and second, to promote the use of eggs produced in the state. It has unquestionably been of great service in this direction. However, South Carolina had a long way to go before she supplied eggs sufficient for her own consumption."

With apparent approval, the department quotes in the same report, from an article in a local newspaper by A. B. Bryan, Clemson College Farm Editor, as follows: "The growing of poultry as a secondary farm income, to replace some of the loss of cotton income, is strongly advocated. The shipping of live poultry has brought hundreds of thousands of dollars into the state in recent years but in spite of the growth in poultry production, the state is still annually sending hundreds of thousands of dollars to other states for eggs."

Surely, South Carolina does not know or forgets that even though she has faced a declining market for many of the products produced within her borders, nevertheless, the other states have sent millions of their dollars into South Carolina for South Carolina's cotton, tobacco and other farm produce.

South Carolina is not the only state to enact grading laws which protect the products of home industry from the competition of the "foreign products" of "sister" states.

Although there is a federal standard for grading eggs, only fifteen states have adopted this standard. Twelve states have neither adopted the federal standard nor have one of their own. The remaining 21 states require eggs to meet the standards set up by the state. These grading standards vary from each other and from the federal standard. This lack of uniformity alone constitutes a hazard to free interstate trade.

Beyond the hazard of conflicting

IN more ways than one, food manufacturers have a stake in the mass of food laws and other legislation which erects barriers to the free flow of interstate trade. Each law which interferes with the free flow of trade adds to the cost of distribution and raises the price to the consumer.

In a few cases where the consumer has been consulted relative to a trade barrier law, the consumer has ruled against the law. Consumers, however, are rarely given the opportunity to voice an opinion. Instead, they make their opportunities. Through consumer groups they bring pressure on Washington. They not only express opinions, they ask —they demand—federal regulation, federal control, public ownership. Is this what food manufacturers want?

egg-grading standards are the laws set up by some states with the apparent intention of limiting, if not prohibiting, the importation of eggs (regardless of quality or price) from other states.

Georgia requires that all eggs from other states sold in Georgia must have stamped or imprinted on the shell of each egg in letters not less than ¼-in. in height in indelible ink the letters "shipped". Florida requires out-of-state eggs to be labeled "shipped (state of origin) eggs", eggs held for any length of time under refrigeration to be labeled "cold storage eggs (state of origin)," and eggs produced within the state "Florida eggs". Florida has two other grades of eggs, "unclassified eggs and processed eggs". The place of origin of these two grades must appear on the placards indicating the grade when offered for sale.

Montana's egg-grading law is unique. Section 7 of the fresh egg law, effective July, 1935, is as follows: "All eggs imported into the state of Montana from other states or foreign countries shall be sold as such. The case or container in which they are shipped shall have the words 'foreign eggs' or the word 'eggs' preceded by the name of the country or state where produced, displayed thereon in letters two (2) inches high. All retailers of said eggs shall sell them from the container in which he receives them and shall inform each purchaser that said eggs are foreign eggs. All restaurants, hotels, cafes, bakeries and confectioners using or serving foreign eggs in any form, must place a sign in letters not less than four (4) inches in size in some conspicuous place so the customer entering their place of business can see it, to read 'We use foreign eggs' or the same with the exception that the name of the country or state where the eggs were produced may be submitted for the term 'foreign' ".

In order to place out-of-state products at a disadvantage, Rhode Island has established a top grade that can be met only by produce raised within the state. Only eggs produced in Rhode Island are entitled to the grade "Rhode Island Specials".

The economic value of grading is beyond question. Grading establishes a common language between buyer and seller which has become more necessary as the distance between producing area and market has increased. The need for grading was recognized years ago, particularly by producers shipping fruits and vegetables from the North and Northwest. Many different districts set up their own standards for grading and many shippers within each district set up grading standards of their own. The confusion was soon so great as to require state enactment of state grading legislation for fruits and vegetables. State and federal grades have now largely been substituted for private grades previously sponsored by local groups. This is a marked advancement over the previous chaotic condition, but from the viewpoint of interstate trade, the present non-uniformity that exists is more serious than it was in former years.

Not a few states refused to accept either the federal inspection or the inspection of other states as qualifying products to enter the channels of commerce in their own state, but insist upon grading these "imported" products according to the standards of the home state by home state inspectors, charging an inspection fee for the benefit of the home state treasury. According to a bulletin of the United States Department of Agriculture, it is reported that Montana has been forcing the use of its official state grades by stopping all trucks entering the state with loads of fruits and vegetables. The produce is inspected and an inspection fee is charged, whether or not a federal-state inspection certificate accompanies the produce. California, like Montana, stops trucks at the border for inspection and like Montana does not recognize the certification of some other state.

Unquestionably, the conflicting grading laws in many states serve as barriers to free interstate trade. The growth of these laws restricting free

U. S. Department of Agriculture Photo

A group of cans now in use in interstate commerce. Should the states apply standards to cans as they have to other types of containers varying in like manner from state to state, it is not difficult to visualize the confusion which will result.

interstate trade should be of deep significance to the food manufacturer. Many of the state grading laws are retaliatory in nature. Many states set minimum standards for products produced within their own borders which bar the sale of products of other states because they do not measure up to the minimum requirements. In view of all the state legislation enacted to protect home products, it is not altogether fantastic to imagine some of the states enacting laws to protect local food manufacturers from the competition of "foreign manufacturers" from other states. Florida attempted to protect its own citrus fruit interests from the competition of "imports" from other states by a law passed June 10, 1937 (FOOD INDUSTRIES, Jan. 1939, p. 34). This statute provides that every label upon any container of canned citrus fruits or juice shall show accurately the state or country in which the fruit or juice was produced. This statute further requires that every container used for citrus fruit or juice produced in Florida "shall have stamped into or embossed upon the tin, glass or other substance of which such container is made" the word "Florida". Only citrus products of Florida may be inclosed in containers bearing the name "Florida".

A Connecticut law states, "No person, firm or corporation shall sell or distribute bread or pastry products of any bakery located beyond the boundaries of this state unless such bakery shall have obtained a certificate of inspection from said commissioner. Such certificates shall be valid for one year . . ., and a fee therefore shall be collected." The ability of the state to restrict bakery "importations" into the state depends merely on the type of enforcement applied through this law.

Several states have passed laws interfering with or prohibiting the "importation" of beer and wine from other states. State margarine laws are familiar to all.

It is only one step further for any state to set up standards for manufactured foods based on slight differences of composition or physical characteristics which will bar out-of-state manufactured foods from entering into competition with the manufactured food products of the home state.

Container Standards

The confusion which resulted through the adoption by many states of variable measurements for a "standard barrel" resulted in a single federal standard for all barrels used in either interstate or intrastate trade. Many types of containers, crates, boxes, etc., have no federal standard. Various state standards provide for fifteen different sizes of canteloupe crates and seven apple boxes. Some state standards are based on weight, others on dry measure. A bushel of potatoes in Pennsylvania is a full sack of specified dimensions, but in Ohio a bushel of potatoes is 60 lb., no more, no less. The extent to which the lack of uniformity of trade standards for containers might result in adding barriers to free interstate trade is illustrated by the conflict between Oregon and California. Oregon made its berry box standards compulsory for boxes shipped out of the state, and California declared such boxes illegal for sale of berries within the state of California.

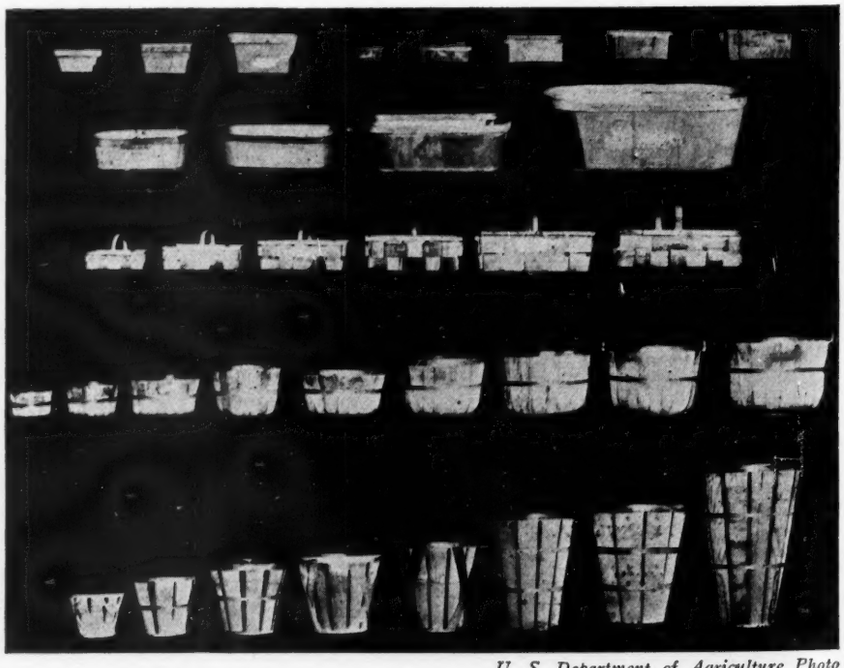
Labeling Laws

Few and scant were the food labeling laws enacted by any of the states prior to the Federal Food and Drug Act of 1906. Now, however, the food laws, many of them labeling laws, on the statute books of the several states are legion, hampering free trade, increasing the cost of distribution and threatening to change the status of food manufacturers to that of law firms.

In some states, the canners or bottlers of pineapple or tomato juice are subject to the laws covering the products of canners and packers. In other states, however, they are subject to the laws and license regulations covering manufacturers of carbonated beverages. In Connecticut, both these juices are classified as beverages. So are they also in Maine, New Hampshire, Pennsylvania and Rhode Island. In all these states, pineapple and tomato juice are subject to the beverage laws. However, Delaware, Louisiana, Massachusetts, North Carolina, Oregon and Wisconsin do not consider these two juices as beverages. And the sincere and cautious food manufacturer who attempts to become informed will not find these interpretations in either the laws or the regulations. The correct interpretations may, however, be learned by a "consultation" with the enforcement officers of the respective states.

The way of the state food laws is not easy. In Michigan, pineapple juice is a beverage, but tomato juice is not. Maryland has still other slants on what is a beverage and what is not. Grape juice, pineapple juice and orange juice are beverages only if they are in glass bottles. They are not beverages if offered for sale in tin cans. Tomato juice and prune juice are liquids but never beverages in the state of Maryland.

Manufacturers of fruit juices in Ohio are subject to the license provisions of the state laws pertaining to the operations of canneries, but do not come under the beverage laws. All juices are beverages, however, in North Dakota, except tomato juice,



U. S. Department of Agriculture Photo

The constitution gives Congress the power to standardize containers. Acting under this authority, Congress has standardized certain fruit and vegetable containers, reducing the number of berry boxes from 44 to 3, splint or market baskets from 40 to 6, hampers from 75 to 9.

U. S. Department of Agriculture Photo

Above, 2-, 4- and 12-qt. climax or grape baskets. Shipments of other sizes in interstate trade are now prohibited by law. Below are 31 types of climax baskets which were in general use in 1917 before the establishment of federal standards.

while in Nebraska no pure juice is a beverage unless to it has been added sugar, water or some other ingredient. Then it becomes a beverage and requires a beverage license for its manufacture. Rhode Island views juices still differently. There pineapple and tomato juices are beverages but the law interprets the juices of carrots, beets, and sauerkraut to be non-beverages.

Labeling laws of the various states are legalized under a privilege granted the states by the Constitution, which permits them to pass laws necessary to protect the health and safety of the people, even though it expressly prohibits the erection of any barriers to free trade.

Though it may be necessary for the state to protect the health and life of the people of the state (even though the Federal Food and Drug Law is rigorously enforced), the very existence of a multitude of conflicting state food licensing and labeling laws sets up undisputable barriers to free interstate trade.

Most of the states recognize corn sugar and corn syrup as legitimate sources of sweetening for carbonated beverages and fruit juices. However, unless recently changed, the laws in Alabama, Montana, Ohio, Pennsylvania and Wyoming prohibit the use of sweetening derived from corn. Delaware, Louisiana and Maryland leave the matter to the discretion of their Departments of Health.

No state food laws specifically rule against glucose, grape sugar or oleomargarine as ingredients in food products, but Colorado and Michigan require that when these products are used as ingredients in a food, the label shall state the "percentage in which glucose or grape sugar, oleomargarine or suine have entered into composition of food."

Five per cent sugar content is sufficient for sweetening carbonated beverages in Connecticut, New Hampshire, and Illinois, but the law requires 7 per cent in Maryland, Minnesota and Ohio and 8 per cent in Michigan, Montana, Oregon, Pennsylvania and Kentucky.

Minnesota requires a 6 per cent content of fruit juice for fruit juice drinks; Connecticut, New Hampshire, North Dakota, Indiana and Kentucky require 15 per cent concentration for orange drinks. A lemonade in Indiana or Kentucky is "safe" which contains 5 per cent lemon juice but not in North Dakota, where it must contain at least 10 per cent. A lime rickey in North Dakota need contain only 6 per cent lime juice but grapefruit drinks require 15 per cent juice. Minnesota says 6 per cent is sufficient for any fruit juice drink.

Massachusetts, Minnesota, New Hampshire and North Dakota consider labeling on the cap or crown of a container sufficient and give permission in their food laws regulating labeling. Many other states neither permit nor deny the use of the cap label. Washington, however, refuses to recognize the crown or cap as sufficient for carrying a label. This state requires a paper or blown on label on all containers that qualify for distribution in that state.

Some of us think of the United States as one country where all share equally in the public benefits—the protection and services performed for the good of all. But we are old-fashioned—our ideas of equality and the need for equality are antiquated. That which is sufficient for the health and protection of millions in 40 states will not meet the health requirements of the other eight states—nor amply protect them against the evil practices of fraudulent manufacturers. Neither will the laws of the 40 states protect the home industries of the eight from the importation of "foreign" foods, from the other 40 states.

At times, food manufacturers may have found the restrictions of the old Federal Food and Drug Law a bit restraining. Many food manufacturers are certain to find that the new Food, Drug and Cosmetic Law deprives them of even greater option and latitude of operation. But even so, one law is better economy and easier to comply with than 48 laws—all at great variance.

Since the ratification of the Constitution, the states have been loath to relinquish any powers rightfully theirs or purloined by them. The Federal Government has upon occasion been restrained by the Supreme Court from assuming too great a portion of the powers granted the states or assumed by them. The situation might seem stalemated were it not for the fact that the Council of State Governments promises to open the way for mediation between the Federal government and the states. It appears not impossible for all concerned to become reconciled to uniform laws, regulations, grading and labeling. At what better target could the food manufacturers aim their public relations bullets?

State Financed Advertising Campaigns

Large-scale advertising of farm produce, financed by states to promote state products, began only five years ago. The money to pay for these advertising campaigns ($2,579,000 for the 1938–39 campaign was collected by the state from producers or appropriated from general tax collections.

State Taxes and Expenditure for Advertising Farm Products (1)*

State	Date of first legislation	Product	Unit	Per unit tax, if any 1934–35	1935–36	1936–37	1937–38	1938–39	State expenditures for advertising 1934–35	1935–36	1936–7	1937–38	1938–39
New York	May 1934	Milk	100 pounds	$0.01	$0.01	$0.00½	$0.00¾	$0.00¾	(2) $500,000	(2) $450,000	(2) $250,000	(2) $300,000	(2) $300,000
Florida	June 1935	Oranges	Box	....	.01	.01	.01	.01	.....	405,349	774,086	798,615	(3) 850,000
		Grapefruit	Box	....	.03	.03	.03	.03					
		Tangerines	Box	....	.05	.05	.05	.05					
Wisconsin	Sept. 1935	Dairy products	.....	....	....	....	....	....	.....	(2) 50,000	(2) 50,000	(2) 75,000	(2) 75,000
Idaho	March 1937	Apples	100 pounds	....	....	....	.01	.01	.....	.....	.....	.....	(4) 14,400
		Prunes	100 pounds	....	....	....	.01	.01	.....	.....	.....	.....	(4) 2,400
		Potatoes	100 pounds	....	....	....	.01	.01	.....	.....	.....	.....	(4) 99,600
		Onions	100 pounds	....	....	....	.01	.01	.....	.....	.....	.....	(4) 3,600
Washington	March 1937	Apples	100 pounds	....	....	....	.02	.02	.....	.....	.....	217,565	(5) 207,000
Maine	March 1937	Potatoes	Barrel (165 pounds)	....	....	....	.01	.01	.....	.....	.....	(5) 145,400	(5) 121,000
		Canned sweet corn, blueberries, lobsters, and scallops	.....	....	....	....	....	....	.....	.....	.....	(6)	(6)
Massachusetts	May 1937	Apples, milk, and poultry	.....	....	....	....	....	....	.....	.....	.....	.....	(2) 15,000
California	June 1937 (7)	Canning cling peaches	Ton	....	....	....	....	....	.....	.....	.....	(8) 323,000	.....
		Fresh Bartlett pears	50 pounds	....	....	....	1.00	.03	.....	.....	.....	(8) 86,000	(8) 60,000
		Prunes	Ton	....	....	....	.03	.75	.....	.....	.....	.....	(3) 125,000
		Wine, fortified	Wine gallon	....	....	....	....	.01¼	.....	.....	.....	.....	(3) 665,000
		Wine, dry	Wine gallon	....	....	....	....	.00¾					
		Wine, grape concentrate	Wine gallon	....	....	....	....	.03					
		Ripe olives	Ton	....	....	....	....	.50	.....	.....	.....	.....	(3) 16,000
Michigan	June 1937	Apples	.....	....	....	....	....	....	.....	.....	.....	(2) 5,000	(2) 5,000
New Jersey	June 1937	Products in season and especially milk, eggs, apples, and blueberries.	.....	....	....	....	....	....	.....	.....	.....	(2) 32,000	(2) 20,000
Total									500,000	905,349	1,078,086	1,982,580	2,579,000

(1) Compiled December, 1938, from State statutes and letters received from State officials and advertising managers.

(2) Appropriation. In the case of New York, the per unit tax is designed to raise approximately the amount of appropriation. In Michigan, private organizations and individuals contributed $12,000 in 1937–38 and $7,500 in 1938–39. In New Jersey, private organizations and individuals are expected to contribute $20,000 in 1938–39.

(3) Preliminary estimate of probable receipts.

(4) Total amount collected in 1937–38 and up to Dec. 15, 1938. No campaign in 1937–38. The authorizing act was being tested in court from November, 1937 to September, 1938.

(5) Estimate, obtained by multiplying the per unit tax by estimated commercial production.

(6) Financed by special appropriations and contributions by private individuals and organizations. The total amount spent in 1937–38 for advertising the 5 products listed (including potatoes) is estimated to be more than $200,000.

(7) Date of enactment of enabling act that authorizes the levy of an advertising assessment on any commodity for which a marketing order has been issued.

(8) Approximate.

* "Barriers to Internal Trade in Farm Products," Table 6, p. 100. Washington, D. C., March, 1939.

Ten states in the 1938–1939 market year entered as antagonists in the battle for agricultural markets, each striving to obtain a greater share for the producers within its own borders.

Advertising is a legitimate instrument in developing free trade. It has built markets for individuals, corporations, producing and marketing cooperatives alike. Large-scale advertising of farm products by sovereign states is different. That such advertising may constitute a barrier to free trade is beyond question—that it begets retaliatory action from other states is proven. State advertising also involves other problems important to food manufacturers.

Company advertising is voluntary. Advertising by cooperatives is by mutual agreement and by consent. Participation in state advertising is compulsory. (Dissenters have taken their cases to court). Money to finance large state advertising campaigns is obtained through levies on the sale of the advertised produce or levies on all the taxpayers within a state by a dip in the general fund.

This brings up a question which can be best set forth by an example. If all the potato producing states engage in either individual advertising drives or a concerted drive to increase the consumption of potatoes with the result that the per capita consumption of potatoes rises greatly, then, some of the food products of other states and some of the food products other than potatoes in potato states must face a shrinking market. Per capita consumption is not elastic. There are on record many examples to prove the fact that as the per capita consumption increases for certain foods or a group of foods, the per capita consumption of other foods decreases. State advertising of one product, if effective, must limit the consumption of others.

This question naturally presents itself. Why promote only the major farm crop or crops of any state? Why not the industries: steel, textiles, chemicals and manufactured foods? The result would be confusion indeed,

(*Turn to page* 471)

When a food manufacturer advertises a product under a state name, such as California artichoke hearts, product of Giurlani & Bro., San Francisco, it has the sanction of the trade, but when a state promotes its own "home products", hard feelings usually result and "offended" states are sure to retaliate, adding still more barriers to interstate trade.

Merchandising Hints

Solace to Cake Baker's Soul

GREAT LIGHTS among the cake bakers, and lesser lights too—artists whose souls revolt at the butchering administered to their creations by the blunt-edged carving tools in the average home—will be heartened by this new cake cutter. Through the center of a corrugated paper disk, which serves as a carrier for the cake, is attached a fine gage wire. The cake rests on this wire until cut. A pull-up on the projecting end of the wire makes a clean cut through to the center of the cake. A pull down at an angle makes another clean cut and sets apart a wedge of cake with unbroken profile. Thus the baker's art reaches the table unmarred by dull knives in blundering hands.

Surpluses Breed Surplus

THE PER CAPITA CONSUMPTION of apples has dropped during the last 40 years from approximately 107 lb. to about 25 lb. per person. During this time the consumption of canned fruits has increased 360 per cent. Among these canned fruits are canned pineapple which has been consumed at a rate greater than the rate of increase in population and canned peaches which throughout a long period of years enjoyed an increased per capita consumption. Fresh peach consumption has, however, declined. Citrus fruits, both fresh and canned, have acquired a greatly increased per capita consumption throughout this span of 40 years.

When a single food, or a group of like foods, attains increased per capita consumption, it must be at the expense of other foods of the same kind or of different kinds.

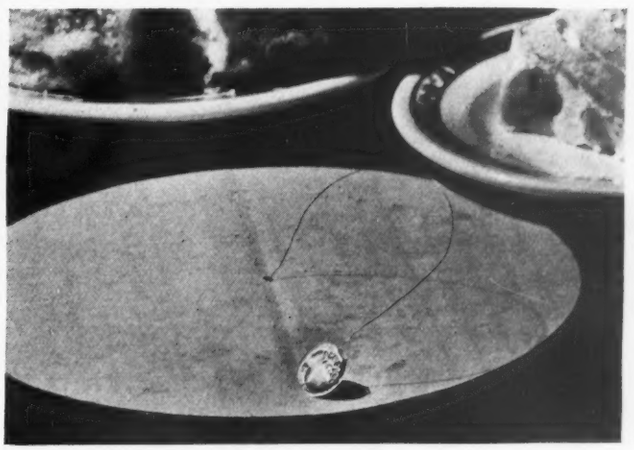
In recent years the production of peaches, particularly the Western yellow cling, has exceeded the country's capacity to consume, not because each family in the country is surfeited with peaches, but because of the increasing popularity of other fruits and juices. Citrus fruits and pineapple have hindered increased consumption of peaches—so have the fruit juices and vegetable juices, particularly tomato juice.

Not only the familiar foods compete today, but the familiar foods must face constantly the competition of new products and new varieties of the old and familiar. And recently citrus fruits have reached a production beyond the consumption capacity, with prospects ahead for much greater production in the immediate years to come. If the production is consumed, there must be attendant a declining consumption of the other foods that are displaced.

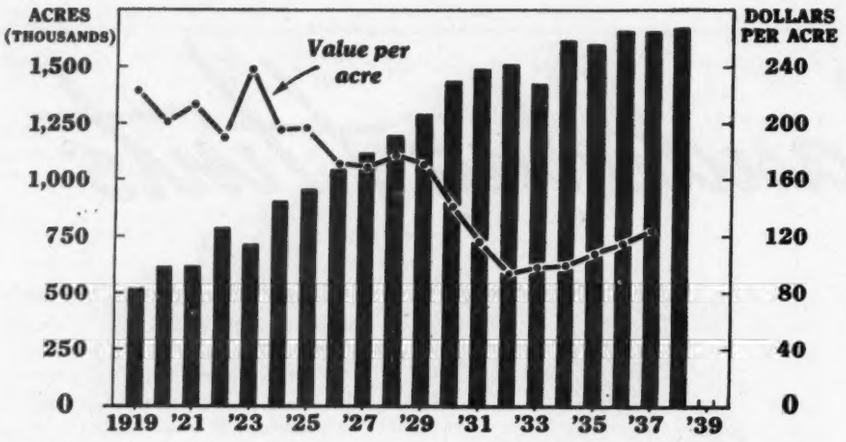
SIMPLY CONSTRUCTED CARRIER

A NEW six-bottle carrier has recently made its appearance in the Midwest section of the country. The "Topper" bottle carrier consists of two wings of heavy paperboard, each wing engaging three bottlenecks. The wings consist of two layers, each punched so that when placed over the bottlenecks and lifted, the necks are engaged. Releasing pressure on the handle, and lifting the top flap, permits the bottle to be disengaged. This carrier forms a six-bottle package for Red Rock Cola, product of Red Rock Bottlers, Atlanta, Ga.

Food DISTRIBUTION



Simply constructed cake cutter



Acreage of commercial truck crops for market, and value per acre, 1919–38. There has been a rapid expansion of acreage of commercial truck crops for market, canning and manufacture since 1919. There was a rather sharp downward trend in value per acre from 1921 to 1932. In recent years the value per acre has risen slightly. Data from United States Department of Agriculture.

Annual Group or Co-operative Advertising Expenditures for Food Products*

		Size of Industry In Dollars Farm Value— 1937
California Citrus (Sunkist)	$2,000,000.00	$150,000,000.00
Florida Citrus (Seald-Sweet)	1,100,000.00	
Texas Citrus (Tex-Sun)	300,000.00	
	3,400,000.00	
Canned Salmon	300,000.00	8,800,000.00
Idaho Fruit and Vegetables	200,000.00	
American Cranberry Exchange	170,000.00	7,000,000.00
California Walnuts	350,000.00	10,000,000.00
Hawaiian Pineapple	750,000.00	
Washington Apples	218,000.00	24,000,000.00
Bartlett Pears	130,000.00	6,000,000.00
California Raisins (Sun-Maid)	150,000.00	
California Prunes and Apricots	125,000.00	
Pea Canners	150,000.00	
The Tea Bureau	1,000,000.00	
The Dairy Industry (National Promotion)	67,535.00	1,530,000,000.00

*"How to Increase Dairy Products Consumption," by Theodore P. Jardine, Executive of the J. Walter Thompson Co., Chicago, Ill., address given at National Dairy Council Summer Conference, Chicago, Ill., June 13, 1939.

There is a law which operates to control food distribution and food consumption. This law is influenced by only an insignificant variable. The law might be stated. Food tonnage is a constant—it varies only with population. An increased consumption of one food product is accompanied by a decreased consumption of one or more other food products.

It might appear that if "that too large a portion" of our population so often referred to as "under-nourished" were stepped up in income to a higher income bracket, that the food consumption of this group would increase. Unquestionably, the character of foods consumed would change, so would the quality. In the deep South, "sow-belly," grits, and yams might suffer a declining consumption and be replaced to a measurable extent by other and different foods. The tonnage of foods consumed would not, however, increase enough to materially disturb the country's per capita food consumption balance.

Among those domestic foods which are over-produced or face over-production are: wheat, corn, peanuts, fresh and processed citrus fruits, cling peaches, pears, apricots and raisins, canned peas, corn, kraut, beans, sugar, fish, cottonseed oil and dairy products.

Many surpluses have been partially or temporarily relieved by drives and strong promotional campaigns. Many of the advertising campaigns indicated in the accompanying table were instituted to relieve a surplus or prevent one.

The distracting feature of surpluses, even when successfully moved, is that they breed surpluses. When food surpluses are moved to market and disposed of for consumption, often because of depressed prices, other foods produced in normal quantities will be consumed in less than normal quantities and new surpluses will be accumulated.

The Federal Surplus Commodities Corporation has purchased for release and distributed to welfare agencies, the following:

79,000,000	lb. dried beans
122,000,000	lb. butter
171,990,000	lb. cornmeal
3,210,000	doz. fresh eggs
1,950,000	boxes of grapefruit
58,500,000	cans of grapefruit juice
13,900,000	lb. of dried skim milk
61,200,000	quarts fluid milk
1,800,000	boxes of oranges
10,000,000	lb. dried peaches
2,264,000	bu. of white potatoes
20,100,000	lb. of raisins
66,600,000	lb. of wheat cereal
178,000,000	lb. of white flour
61,740,000	lb. of wholewheat flour

Many of these food products are included in the list of surplus commodities now being distributed in test cities through retail outlets by the Surplus Commodities Corp.'s stamp plan. One of the weaknesses of this Surplus Commodities Corp.'s plan is that, though the distress caused by surplus production of the commodities distributed under the stamp plan may be partially relieved, other surpluses are certain to be created as a result of increased consumption of foods now in surplus.

Food manufacturers as well as producers should observe closely their chart of inventories as the stamp plan goes into full swing.

Law with a Vengeance

A NEW BILL pending before the House, sponsored by J. Harold Flannery of Pennsylvania, makes the present pure food, drug and cosmetics law look like the work of an amateur. The new bill provides for the label designation of the country of origin of each ingredient in any product or material moving in interstate commerce. Not only would the country of origin of each ingredient have to be shown on the label, but the same information would have to be shown in any advertisement and furthermore mentioned both before and after any radio announcement advertising a product.

Such a law, if passed, would place almost unsurmountable hurdles in the path of many food manufacturers who buy spices, flavorings, vegetable oils, etc., on the open market, to be used as ingredients in the manufacture of their products. According to the law, failure to declare in any advertisement a most unimportant ingredient in a manufacturer's product would make him liable to the penalty for engaging in an unfair trade practice.

Normally, when legislation is being closely scrutinized, there would be little possibility of such a law passing House or Senate. However, bills frequently are put through during closing sessions which would have no chance of passing at any other time. Apparently, Representative Flannery is maneuvering with that end in view.

New Packages & Products

For Company Occasions

FUDGE and chocolate fudge cake icing were two confections on grandmother's sure-fire list. Either grandmother's art has been lost to many modern housewives or the lack of frequent practice has erased fudge and chocolate icings from the sure-fire list of many of them today. Realizing the need of many housewives for a cake icing readily prepared with assured consistency, Chr. Hansen's Laboratory Co., Little Falls, N. Y., has recently placed on the market "Junket Quick Fudge" mix, a dry powder which, with the addition of water and butter, makes fudge or a chocolate cake icing in four minutes. Since the addition of an exact measure of water is necessary to assure uniform consistency for either of the two products, fudge or icing, a paper measuring cup comes packed in each package.

Prepared Coffee

"No MUSS! No Fuss! No Coffee Pot!" The label of the new ready-to-drink coffee claims these advantages for those who serve the prepared beverage manufactured by Wm. Scull Co., Camden, N. J. The label might well have said no trick gadgets to take apart, wash and scrub, no grounds to carry away. The 12-oz. blue, maroon and white lithographed can also states the method of preparation and suggests ways of serving, hot or iced, in making a bid for consumer acceptance. The product has just appeared in Eastern markets.

Coffee for Children

THE NEW PRODUCT, "Sparkoffee Jr.", robs the cradle in making it possible for a large market of youngsters to become confirmed coffee drinkers. The fact that the beverage is prepared from 97 per cent decaffeinated Sanka coffee offers an appeal to young teetotalers who, up to this time, have enviously watched elders enjoying the forbidden coffee. The label states that Sparkoffee Jr. is prepared with carbonated spring water, cane sugar, artificial flavor, and caramel color. Sparkoffee Jr. is a companion drink to "Sparkoffee," introduced by R. H. Macy & Co., New York, last summer.

Food DISTRIBUTION

Make Your Trucks
Speak Well of Your Business

YOUR business methods are reflected in the appearance of the motor vehicles you put on the road. Shoddy vehicles cause people to think of your company and your products as not exactly tops. While clean, well kept, attractive vehicles convey the impression of a successful business and of quality products produced in sanitary plants. These and other phases of the public relations value of motor vehicles are discussed by leading food executives in the following symposium.

Trucks Reflect on Business

Trucks engaged in carrying foods should be painted in light colors and kept clean. Trucks painted in dull, dead colors would certainly not convey the thought of cleanliness.

Trucks painted in light colors, of course, have the tendency to appear much larger than they actually are. I don't see any particular disadvantage to this, however, other than the psychological effect it might have upon motorists on the highway.

Trucks should also be kept in a good state of repair, as they reflect the manner in which their owners do business.

Where possible, drivers should wear uniforms. Personally, I think greys or light blues are better than white since they will stay clean longer. A dirty white would be worse than no uniform. Twice a week should be often enough to change to clean ones.

Drivers should go out of the way to be courteous to motorists and pedestrians. There is no easier or cheaper way to build good will for their employers. One act of discourtesy by a driver can result in a lot of damage to his firm.—A. E. SINCLAIR, *general superintendent, Kingan & Co., Indianapolis.*

Food DISTRIBUTION

Vehicles Part of Community

Through motor vehicles, the manufacturer comes in contact with the public more on the public's own level. The motor vehicle represents the manufacturer as a living, functioning personality, taking an active part in the everyday life of the community.

We have always been impressed with the importance of maintaining vehicular equipment in the best possible state of repair and appearance.

Special stress is laid upon cleanliness. Trucks are washed each day after they have checked into the garage. Daily inspections for mechanical condition are part of our program, and any mechanical defects are immediately adjusted. Equipment is painted at least once each year, and scratches and dented fenders are repaired and repainted before trucks are permitted on the streets again. By maintaining a high standard for mechanical condition and general appearance of vehicular equipment, we are assured of making an impression on the consuming public that will reflect advantageously in the sale of our product.

Drivers are furnished with washable uniforms, and these are changed daily.

Perhaps the most important part played in public relations by motor vehicles is the conscientious practice of courtesy and safety by drivers. Much of the good will gained through a well-painted, clean, presentable truck rolling through the streets can be more than lost when a truck bearing a brand name is involved in a serious accident. Because of this, we must consider each piece of rolling equipment as a possible liability in so far as public relations is concerned. Therefore, we conduct an uninterrupted campaign for safe and courteous driving.

Drivers are furnished with all general literature, as well as some special literature, designed for their guidance in the proper operation of their vehicles. Special emphasis is placed on conformation with the usual rules of the road as well as some special rules of our own. Bulletins and posters are continually posted as a follow through in this campaign. A safety award of $3 is presented at the end of each month to those drivers who have completed the month without an accident of any kind.

An elaborate system of rating drivers has been inaugurated and safety committees have been formed to hold hearings on each accident and to determine the future rating of the driver involved. All this machinery tends to make the driver especially conscious of his safety responsibilities. And since courtesy breeds safety, special emphasis is given to the driver's conduct with respect to other drivers and pedestrians.

As a result of this activity, unusual safety records have been achieved, and safety trophies have been awarded to various groups. The publicity given these awards, plays, we feel, an important part in our public relations.—E. B. LEWIS, JR., *vice-president, Pioneer Ice Cream Division, The Borden Co., New York.*

Public Relations Medium

Swift & Co. operates some 3,200 motor trucks and 3,000 motor cars. We regard every one of them as a medium for the maintenance of good public relations. Properly maintained and directed, this large army of Swift men and machines on the highways can advertise our products and at least avoid giving a poor impression of Swift & Co., the institution.

The first Swift delivery wagon was painted red. For 60 years meat dealers all over the United States and Canada have received their food products from Swift & Co. in red trucks, horse drawn, or, as now, motorized. It is hard to break with such a tradition, and so red continues to identify Swift trucks today despite a realization that red is not as durable as some other colors.

The body and chassis of each vehicle are kept clean. The inside of every truck is scrubbed daily, and the outside is washed as often as necessary. Trucks doing country duty frequently are washed three or more times a week.

Kingan & Co. believes that trucks which carry food should be painted in light colors and kept clean and in good repair.

Swift truck chaffeurs wear simple uniforms. If a driver handles meat he wears a white smock over the regular uniform. In summer, the uniform consists of a blue covert shirt and heavier blue trousers. A short jacket of blue covert, a cap with a removable cover, a black bow tie and red, white and blue Swift emblems on the shirt pocket and the cap complete the ensemble. The winter uniform has the same general appearance but the trousers are blue corduroy and the jacket is of navy blue zipper style.

Frequency of cleaning uniforms depends on the type of work the driver is doing. All uniforms are cleaned weekly, or oftener if necessary.

We have had a great many compliments on the courtesy of our drivers, but we conduct no special training course in this field. Every driver understands that he is to practice the courtesy of the road and to use common sense in emergencies. Drivers have, on occasion, helped women motorists change tires, have towed cars out of ditches, gone for help in accident cases, and have rescued snowbound families under trying circumstances. In the Pennsylvania and New England floods the drivers volunteered to help carry refugees to safety. Trucks have been ruined on such mercy errands, but the policy remains the same. It's simply to be courteous and use common sense.

Our motor cars have the same color scheme as the trucks. The red cars are good advertising and tend to make the salesmen more cautious than they might be in a car less conspicuous than their "little red wagons."—ALBERT W. BATES, *Swift & Co., Chicago.*

Horses Set Example

In the old days of horse-drawn vehicles, the successful distributor paid more attention to his horses than he did to his vehicles. Brewers and meat packers particularly vied with one another in putting on the street the most magnificent dray horses that money could buy, matched for color, groomed to perfection, with glossy manes and gleaming harness. Even though an occasional "dry" wrote a song or a poem about the "Brewers' Big Horses," there is no doubt that these showy animals created public good will. These horses seemed to impress you with the feeling that they belonged to a successful business with a good product, and that they must have a kind-hearted and considerate owner.

The motor vehicle, however, is replacing the horse-drawn vehicle in all lines of distribution, and it often creates ill will through blocking the highway, hogging the road or otherwise delaying traffic. Annoying horns and noisy engines disturb the public, and on rainy days, it is not safe for a pedestrian to go near the curb lest some truck splash him with water from the street.

Pleasure cars are just as guilty as trucks when it comes to sprinkling pedestrians with water from the street, but you don't know who is driving the pleasure car and you do read the name on the truck.

These are a few of the opportunities the motor truck has to create ill will. Their recital will suggest to you many others.

There are those who regard motor truck bodies as traveling billboards and present their appeals to the public on the panels of the body. Some owners regard the bodies as bulletin boards on which they can announce prices, new items, specialties and so forth. Some truck owners paint a different design on each side of the vehicle, so as to have two traveling billboards instead of one.

I know one truck owner who always misspells one or two words on each side of his truck. In his opinion this attracts attention and brings him many postal cards, letters and telephone calls from customers or prospects who are impressed with the error and think the painter has made a mistake which the owner did not notice.

Motor trucks can, and often do, express the personality of the business in which they are engaged. And there is no doubt that a truck which is of pleasing appearance and design, is in good operating condition, and is driven by a courteous driver, can and does create public good will.—L. J. SCHUMAKER, *president, American Cone & Pretzel Co., Philadelphia.*

New Refrigerating System for Trucks

Cooled compressed air for refrigeration produced in self-contained unit mounted outside body

PARTICULARLY designed for motor vehicle bodies handling food is a new system of refrigeration made available by Articulair Corp., Detroit, after four years of development. In this system, air is compressed and cooled outside the body and is then carried under pressure in a closed circuit to the body interior. There, its expansion assists in cooling the products. Exclusive of the truck or trailer body with its insulation, the cost of the Articulair equipment and installation varies from $850 to $1,300.

The system is designed to provide a positive means of refrigeration subject to accurate mechanical control of interior body temperature of from 32 to 60 deg. F. in accordance with the requirements of the food product being carried. It is claimed that such temperatures can be maintained within one degree of variation irrespective of the distance over which the foods are hauled, since the equipment is entirely self-contained and depends for its operation only upon an adequate fuel supply for a small gasoline engine or other similar sources of power.

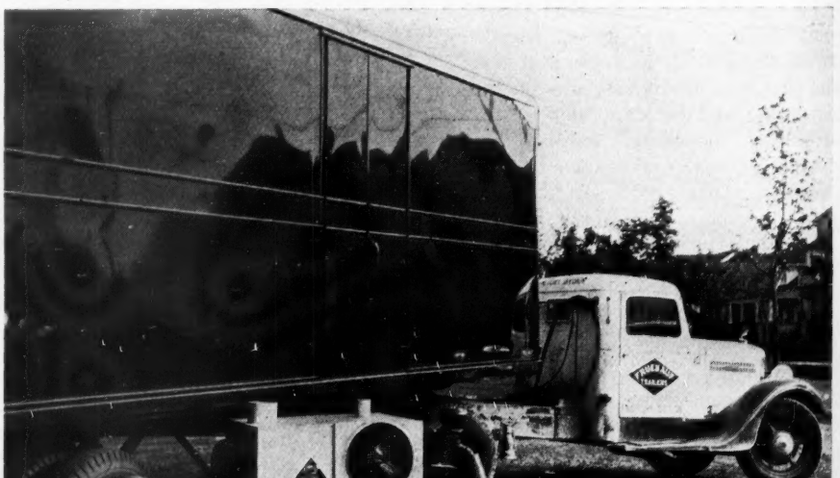
The method is known as the Articulair "Pressure Refrigeration" and Air Conditioning System. It is new in principle and is not comparable with other methods of refrigeration such as the natural convection or forced convection systems most commonly used in motor vehicle bodies. The Articulair principle is new in that it utilizes air under pressure as the refrigerant. Air under pressure does not by itself refrigerate unless, as in the Articulair system, the air, when cooled, is allowed to expand.

The Articulair system differs from usual air-conditioning equipment in which air of certain characteristics is forced into an enclosure at one side and exhausted out at the other. Instead, the air is circulated in a closed circuit under pressure, with no exhausting of the air; although from time to time, owing to leakage, additional outside air is taken into the circuit to maintain the desired pressure.

In the Articulair system, the pressure inside the refrigerated body is greater than the outside atmospheric pressure. However, the difference in pressure, not over ½ lb. per square inch, is not sufficient to collapse any well-made body structure.

Since the refrigerating air is circulated in a closed circuit, coloring or ripening gases now used in the preparation of fruits or vegetables for market may be injected into the system so that this work may be done while the foods are in transit. Also, other gases may be injected for killing bacteria or for destroying scale, vermin or insects.

If the refrigerated vehicles can be driven into the orchards or fields where fruits and vegetables are grown, the latter may be directly loaded into the



Articular refrigerating unit ready for attachment on the underside of an insulated semi-trailer body. Except for a cold-air distributor arrangement on the floor of the body, two filter grills in the roof and a return duct in the side insulation, all of the unit is outside of the body. This permits almost the entire cubical capacity to be utilized for the payload. The small gasoline engine power plant is shown at the right of the unit. Only four connections to the body are required. These are a gasoline connection to the unit engine; a pipe connection for delivering cold air to the floor of the body; a pipe connection for returning the warm air to the unit; and a ¼-in. tube connection (not shown) to a three-way valve which regulates the pressure inside the body. Since the cooling air is under pressure at all times, the pressure inside the body is slightly greater than atmospheric. This prevents any outside dust, dirt or odors from getting into the foods while in transit.

Food DISTRIBUTION

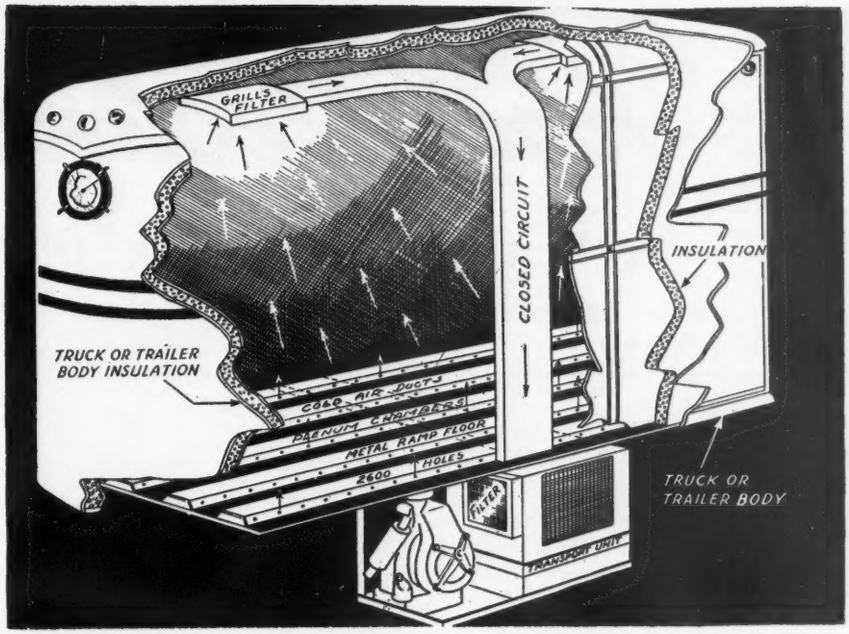


Fig. 1—Broken-away view of a semi-trailer body showing the closed circuit of the cooling air under pressure in the Articulair refrigerating system. The cooling air at a temperature of 30 deg. F. and a speed of 1,200 ft. per minute reaches the underside of 27 lengthwise plenums at a pressure of 3 lb. per square inch. Through a total of 2,600 small holes 5/64, 3/32 and 1/8 in. in diameter in the plenums, the air expands into the body proper, picking up heat so that its pressure is reduced to from 1/16 to 1/2 lb. per square inch. The more heat there is in the products to be cooled, the faster does the cool air expand, and more expanded air is fed to the vacuum side of the air compressor and more cold air released through the floor. If there is no heat in the body above the temperature required, there is an automatic slowing up of the mechanism in the control of the closed circuit which automatically operates the two bypass valves and other pressure controls as detailed in Fig. 2.

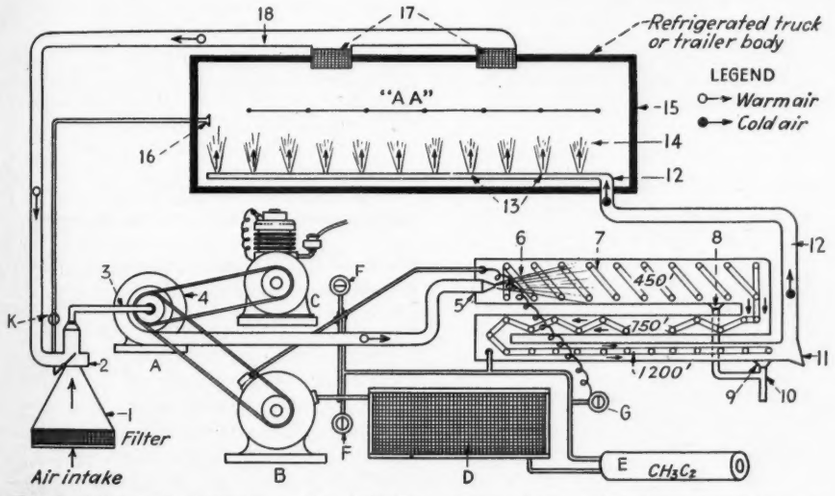


Fig. 2—Schematic diagram of the Articulair system showing the free air intake at 1; the three-way air valve at 2; the intake of the air compressor A at 3; the compression chamber of the compressor at 4. The gasoline engine power plant C drives the air compressor A, which in turn drives the methyl chloride compressor B. Through 5, air injected into the Culair cabinet at 6 at a pressure of 3 lb. per square inch passes over coils refrigerated with methyl chloride and almost instantly condenses moisture which is trapped at 8 and short-circuited to trap 9 where it may be removed at 10 by a manually controlled valve or broken up in a suction or vacuum arrangement as shown at 11 and returned at 12 in approximately the same number of grains of moisture as that with which it entered at 5. 12 represents the plenum chamber corrugated floor with its 2,600 small holes 13 through which the cool air enters the body and expands at 14, picking up the heat of the product carried. The more heat in the product, the faster does the expansion take place, and this affects the pressure at 16. In the body AA, the air is removed at the filter grills 17, as fast as the pressure is noted, passing down the ducts 18 within the walls of the body and back again to the three-way valve 2, thus completing the cycle of the closed circuit when the pressure adjustment K is satisfied with the conditions affecting 16. D is the methyl chloride condenser coil. E is the methyl chloride receiver. At F are automatic expansion bypass valves for controlling variable conditions. G is a pressure regulated thermal valve in the liquid methyl chloride line.

bodies and the precooling started immediately and completed while in transit. Such a procedure would eliminate the cost and delay of handling into and out of a local cold storage plant and thereby permit the picking of more fully-ripened fruit and vegetables of better taste and greater food value.

It is also possible to humidify, dehumidify or maintain normal moisture content in the truck body by reason of the closed circuit. In humidifying, water must be added from some outside source.

Because a truck or trailer chassis, an insulated body and the Articulair equipment are all essential to the complete refrigerated unit, the Articulair Corporation will recommend to prospective users the proper combination to secure desired results under varying conditions. It will guarantee not only its own equipment but the desired results if its recommendations are followed, even though the body work and equipment installation are carried out by designated local body builders.

The principle of the Articulair system and its details may perhaps be most readily understood by a study of the accompanying illustrations. However, in brief, the equipment consists of a small 2½-hp. gasoline engine; an air compressor; a methyl chloride compressor; a refrigerant heat exchanger or methyl chloride condenser coil; and a Culair cabinet in which the air is cooled and speeded up from 450 ft. to 1,200 ft. per minute and then led to a so-called plenum chamber or distributor on the floor of the truck body. The longitudinal hollow strips or chambers which comprise the distributor have a total of over 2,600 small holes. The cool compressed air enters the body through these holes, expands and rises to the top, leaves through two filter grills and passes down through a duct to a three-way valve located between the free-air intake filter and the air compressor, thus completing a closed circuit.

Food Technology

NEW DISCOVERIES & INVENTIONS

FOOD TECHNOLOGY

Margarine Emulsions

MARGARINE may be thoroughly satisfactory in color, flavor, aroma and appearance, yet be inferior because of poor emulsification. A properly emulsified margarine should show not more than a few small blue spots on Knudsen test paper, which is turned blue by water droplets. Suitable emulsifying agents are needed in margarine manufacture.

One such agent is a colloidal solution, in fresh oil, of oxidized and polymerized glycerides of linoleic and linolenic acids. It is made in Denmark under the name of Palsgaard's emulsion oil. Another is "Pancol," a German preparation comprising a mono-diglyceride and a small proportion of sodium sulphoacetate. The cetyl ester of sulphuric acid has also been recommended. These emulsifying agents facilitate formation of a very finely dispersed water-in-oil emulsion such as is needed for margarine.

Lecithin, on the other hand, is not an emulsifying agent for margarine although it has emulsifying properties. It promotes formation of undesirable oil-in-water emulsions. Its use in margarine is as a browning and anti-spattering agent for use as a cooking fat. Lecithin is preferably added to margarine after emulsification rather than before.

Digest from "Emulsion Oils in Commercial Margarine Production," by L. Erlandsen, *Fette und seifen* 46, 147, 1939 (Published in Germany).

Packaging Powdery Foods by Compression

ROLLS OF COFFEE or oatmeal which can be sliced, container and all, are described and illustrated in British Patent 500,083 (granted April 27, 1939, to J. W. Bell, Toronto, Ontario). Other dry, powdery food products can be put up in the same convenient style of package. The material is compressed at least to half its normal volume and introduced into a fiber tube, thus forming a hard solid package. The tube is closed by a metal cap. The user slices through the tube to detach as much of the food product as may be wanted at one time. The metal cap is then replaced on the shortened package.

The cylinder of compressed coffee, or other product, is made by pressure of rams in an evacuated mold and is forced by another set of rams from the mold directly into the fiber tube.

Oil Aids in Apple Storage

THE EFFECT of a thin film of mineral oil on the keeping quality of apples in cold storage was tested with Schoner von Boskop and Baumann's Renette apples. Oil was applied by dipping the fruit in a mineral oil emulsion. After three months in cold storage, the apples were still crisp and fresh. There was only a slight weight loss. Spoilage by molding was negligibly small. The oil film should not be too thick because a thick film retards ripening or may even halt the process entirely. Oil-coated apples must be well washed before use.

Digest from "Influence of Mineral Oil Emulsion Films on Keeping Quality of Apples in Cold Storage," by G. Kaess, *Zeitschrift fur die gesamte Kulte-Industrie*, 45, 227, 1938 (Published in Germany).

Removing Lead Spray from Apples

VARIOUS METHODS of washing apples to remove residual lead arsenate have been compared on fruit from orchards in Maryland and West Virginia. A simple wash with 0.5 per cent aqueous hydrochloric acid at room temperature, giving one minute exposure in a flotation washer, removed 54 to 79 per cent of the residual lead in the 1934 crop, and 28 to 72 per cent in the 1935 crop; averages, 68.5 and 54 per cent. With 1.5 per cent aqueous hydrochloric acid the average removal was 81 per cent in 1934 and 69 per cent in 1935.

By raising the washing temperature to 100 deg. F. the removal was so improved that nearly all lots were within the tolerances in 1934, but in 1935 this treatment was not sufficiently effective. Adding a wetting agent to the acid gave better results, but adding 1 per cent sodium chloride gave no benefit either at room temperature or at 100 deg. F. When the washing temperature was raised to 110 deg. F. there was slight heat injury to York Imperial apples. At 120 deg. F. this injury was more serious.

On apples which had been sprayed with lead arsenate-mineral oil emulsion removal was greatly improved by adding 1 per cent of a light mineral oil to the warm acid solution in a flood-brush machine. Apples not sprayed with mineral oil emulsion did not show this improvement.

Digest from "Removal of Lead Spray Residues From Apples Grown in the Shenandoah-Cumberland Valley," by M. H. Haller, C. C. Cassil, C. W. Murray, J. H. Beaumont and Edwin Gould, *Technical Bulletin* No. 622, U. S. Department of Agriculture; 31, pp. 1938.

BAKING & MILLING

Method for Conditioning Grain for Storage

IN AN improved procedure for conditioning wheat, as disclosed in French Patent 838,080 (granted Feb. 27, 1939, to Miag, Muhlenbau und Industrie Aktiengesellschaft, Braunschweig, Germany), the moisture content is first adjusted to within the optimum range by washing the grain or by any other suitable humidifying method. The grain should contain not less than 17 per cent nor more than 22 per cent of moisture. Gentle heat is then applied (122 to 140 deg. F.) for a considerable time, after which the grain is dried in vacuum at a lower temperature (99 to 104 deg. F.), and cooled to the temperature at which it is to be stored. This procedure is readily adaptable to continuous conditioning.

Action of Proteins in Flour

THE ACTION of improvers in flour was thought to be oxidation until ascorbic acid (a reducing agent) was found to be an effective improver. Study then revealed that many organic redox (reduction-oxidation) systems, though differing widely in chemical structure, act as improvers. Often it

(*Turn to page* 472)

The Food Industry News

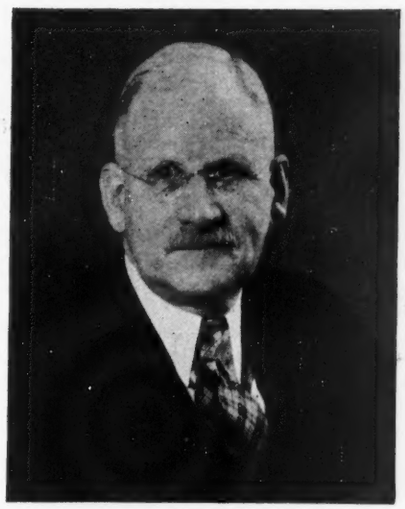
Food Technologists Form Institute at MIT Meeting

Signifying the lowering of intellectual barriers between the 30-odd branches of the food business, a new organization known as the Institute of Food Technologists was formed on July 1 at Cambridge, Mass. The purpose of the Institute is to facilitate interchange of ideas among its members, to stimulate scientific investigations into technical problems dealing with the manufacture and distribution of foods, to promulgate the results of research and food technology, to offer a medium for the discussion of these results and to plan, organize and administer projects for the advancement and application of science in so far as it is fundamental to a wider knowledge of foods.

The Institute will have three classes of members: members, affiliates and corporate members. Members must be qualified by professional training and experience in food technology, while an affiliate is a person active in special limited aspects of food technology or a scientifically trained individual looking forward to a career in food technology. A company or corporation utilizing the services of personnel trained in food technology and engaged in the production and manufacture of foods, or in the development of the food industry, may become a corporate member and designate a representative.

Heading up the new Institute for the first year is Dr. S. C. Prescott, Dean ot Science, Professor of Food Technology, Massachusetts Institute of Technology, Cambridge. The vice-president is Dr. Roy C. Newton, chief chemist, Swift & Co., Chicago; the secretary-treasurer, Dr. George J. Hucker, bacteriologist, New York Agricultural Experiment Station, Geneva, N. Y.

The councilors of the Institute include Dr. F. C. Blank, chief, Food Research Division, Bureau of Chemistry and Soils; Dr. L. V. Burton, editor of FOOD INDUSTRIES, New York, N. Y.; Dr. W. V. Cruess, professor of fruit products, University of California; Dr. Karl F. Meyer, Hooper Foundation, San Francisco; Dr. F. W. Tanner, professor of bacteriology, University of Illinois; Dr. E. J. Cameron, director of research laboratories, National Canners Association, Washington; W. L. Campbell, general manager of manufacturing, Kroger Grocery & Baking Co., Cincinnati; Dr. E. D. Clark, manager, Association of Pacific Fisheries, Seattle; M. E. Parker, manager of production, Beatrice Creamery Co., Chicago; and L. W. Waters, vice-president in charge of research, General Foods Corp., New York.



HEADS NEW INSTITUTE

Dr. S. C. Prescott, Dean of Science, Professor of Food Technology, Massachusetts Institute of Technology, was elected president of the Institute of Food Technologists, organized at Cambridge on July 1.

Progress Being Made On Standards for Foods

Definitions and standards of identity for canned tomatoes, tomato puree and tomato paste were published in the *Federal Register* on July 18, to become effective on Jan. 1, 1940. Included were standards of quality and fill of container for canned tomatoes. Standards of identity for eggs and egg products were announced in the *Federal Register* of July 20, those for eggs taking effect on Oct. 17 and for egg products on Jan. 1.

Progress is being made in the establishment of standards for other foods under the Food, Drug and Cosmetic Act, though not without difficulty. Climaxing weeks of argument in the sucrose-dextrose battle at various hearings, Patton Perritt, government attorney, has filed proposed findings of fact in respect to canned fruit standards which call for the declaration of dextrose on the label. This stipulation may be applied to standards for all foods in which dextrose is an ingredient. Mr. Perritt contends that sugar and sucrose are synonymous and rejects the argument that sugar means sucrose, dextrose and all other sugars. He also holds that dextrose is not as sweet as sucrose and that when it is used a separate set of Brix readings should be employed.

A complex situation has developed with respect to standards for canned mixed vegetables. John A. Murphy, attorney for the government, has recommended that standardization of formulas for mixtures be deferred to a later date when specifically named mixtures or groups of vegetables falling within the same category can be made the basis of a public hearing. The government has abandoned the standards originally proposed and rejected an alternate proposal made by certain portions of the industry. Yet some of the most powerful branches of the industry support the very standards which the government first proposed.

Names More Surplus Foods

Seven more foods are to be moved to market under the stamp plan, these having been named as surplus products by the Secretary of Agriculture. Six of the foods officially became surplus items on July 16, including rice, cabbage, fresh peaches, fresh tomatoes, fresh green peas and onions (except green onions). On August 1, fresh pears were added to the list. Lard may join the surplus ranks this fall, according to plans of the Department of Agriculture.

Oranges and grapefruit were dropped from the surplus list on July 16. Butter, shell eggs, corn meal, dried prunes, dry edible beans, and wheat and whole wheat flour were kept on the list.

Extends Stamp Plan To Employed Workers

In an experiment to be tried in Pottawatomie County, Oklahoma, including the city of Shawnee, the food stamp plan will be extended to privately employed low-income workers, Secretary Wallace announced on July 26. If this works out satisfactorily and is extended to other localities, it may prove an important factor in food distribution. The Pottawatomie plan differs also from previous food stamp plans in that it is to be applied on a county-wide basis.

BUILDERS OF THE WORLD OF TOMORROW IN FOODS

That there may be better, cheaper and more varied foods in the world of the future, these leaders in food technology are devoting their efforts to improvement of present processes and the development of new. They are here assembled for the dissemination and assimilation of the latest knowledge in food technology. The place is the Second Conference on Food Technology, held at MIT. The time, June 28 to July 1. (By no means are all who participated in the conference present in this group, as the picture was taken before the program was fully under way.)

New Knowledge in Food Technology Presented at Second MIT Conference

Important developments in food technology were presented by leading technical men in the industry at the Second Conference on Food Technology, held at Massachusetts Institute of Technology, Cambridge, Mass., June 28 to July 1. On hand to assimilate the knowledge presented by these authorities were more than 500 members of the food and allied industries. Attendance of men from the food industry was apparently larger than that at the first conference, in 1937, which included many students from MIT.

Setting the keynote for the conference, W. L. Campbell, general manager of manufacturing, Kroger Grocery & Baking Co., discussed Kroger's experiences with quality control in the production of bread, ham and coffee to illustrate in detail how and why the control program was set up at Kroger's. The program begins with the choice of raw materials and ends only at the retail store when the foods are delivered to the retail buyers. According to Mr. Campbell, the control of quality has been very profitable, measured either by profits or increased sales volume.

How quality control is carried on in the canning industry was described by Dr. E. J. Cameron, director of the research laboratories of National Canners Association, who showed the need of an integrated and correlated study of horticulture, bacteriology, chemistry, physics and engineering in securing such control. In other words, it is a food technologist's job.

In an exceptionally frank and comprehensive manner, Dr. H. F. Taylor, president of Atlantic Coast Fisheries Co., explained the problems of quality control in the fish industry, the extent of the scientific knowledge available, the need for additional information, the difficulties encountered in controlling quality and the present status of control in his industry.

Processed cheese and its problems of quality control were described by Dr. L. K. Riggs, Kraft-Phenix Cheese Co., while the same sort of problems in meat packing were related by Dr. R. C. Newton, Swift & Co.

Dr. Roger H. Lueck, research department, American Can Co., showed how the tenderometer, a device for measuring the tenderness of raw peas, was used to predict quality of finished goods, and how improved metallurgy made possible more successful cans as packages for many foods.

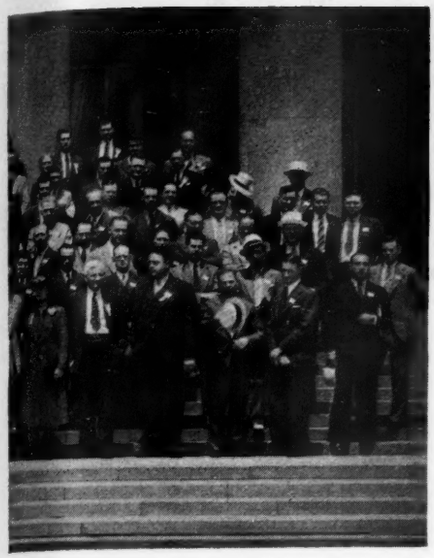
That the effect of heat and oxygen on quality of foods is often confused with the effect of light was the contribution of H. A. Barnaby and Dr. William B. Esselen, Jr., packaging research department, Owens-Illinois Glass Co. Any deterioration of quality of food in glass containers under current methods and speeds of turnover is usually due to factors other than light alone. When manufacturing processes include oxygen exclusion and proper cooling, there is seldom any deterioration.

Clarence Francis, president, General Foods Corp., made a splendid case for more and more research in the food manufacturing industry. He showed clearly how profits are being made from the results of research.

Dr. H. A. Baker, president, American Can Co., showed how a tin can is more than a steel container, coated with tin, and perhaps also enamel; that it is also coated with a film of hydrogen which is a fact of tremendous technical importance to the canning industry and affords a protection that probably could not be attained by any other combination of materials. He also expressed the opinion that development of cooking skill in the United States comparable to that existing in France would materially increase the consumption of canned foods.

The place of the food technologist and chemist in quality control was stressed by Dr. S. H. Ayres, director of research, Crown Can Co. A. H. Haffenreffer, brewmaster of Haffenreffer & Co., told how brewers watch every step in the operation to secure control of quality. H. H. Hall, of Food Research Division, Bureau of Chemistry & Soils, U. S. Department of Agriculture, recounted the investigation leading up to the production of sugar of the quality needed by canners and showed that this form of quality control of sugar was brought about by proper handling of mechanical equipment rather than by uses of chemical or physical sterilizing methods.

A review of all the equipment available for quality control was presented by Prof. B. E. Proctor of MIT. Dr. F. C. Blanck, Food Research Division, U. S. Department of Agriculture, reviewed some of the aspects of quality control that are often little thought of and the needs for four sorts of standards: fac-



tory, legal, descriptive and tolerances.

J. L. Murphy, vice-president, Canada Dry Ginger Ale, Inc., in a paper read by George Beatty, told in great detail of the quality control set up for keeping the products of nineteen plants to the proper standards. In his company, the branch plant executive comes under the jurisdiction of the control laboratory.

Flavor in bakery products and how cross contamination of flavors may occur in poorly ventilated storerooms was the basis of the talk by Dr. J. A. Dunn of Lever Bros. He said that such crossing of flavors is responsible for the "bakery taste" about which the public often complains.

A series of important papers on food engineering occupied the attention of the conference for a full day. Prof. H. C. Hottel discussed the fundamental principles of heat transfer. Loomis Burrell, of Cherry-Burrell Co., traced the development of heat transfer equipment in dairy work. Peter Pirrie, engineering editor of *Bakers Weekly*, reviewed critically the engineering advances in baking technology and suggested the opportunities for further advances by properly trained engineers.

Dr. W. H. Cook, National Research Council, Ottawa, Canada, showed how the cold storage warehouse can maintain a relative humidity of 95 per cent with a heat input equivalent to but 10 to 15 per cent increase in the refrigerating load. Dr. M. E. Pennington, consulting engineer, predicted that commercial storage temperatures for frozen foods will not fall much below –20 deg. F. despite the need for restraint of enzyme action by still lower temperatures because of denaturing of protein colloids at excessively low temperatures.

Significant changes in the proteins in cereal grains and soy beans occur after as little as 30 days in storage in which temperature plays an important role, reported Dr. D. B. Jones, U. S. Department of Agriculture.

Frozen locker plants came in for attention by the food technologists through a report by Prof. F. J. Beard, Iowa State College. He pointed out the character of the technical problems involved which require very intelligent handling.

Several of the papers presented at the MIT conference will be published in future issues of FOOD INDUSTRIES.

Connecticut Enacts Uniform Food Law

Connecticut has passed a uniform Food, Drug and Cosmetic Act which was approved June 29. It becomes effective July 1, 1940, or upon the effective date of the federal act, if such date shall precede July 1, 1940.

The purpose of the act is "to promote uniformity of state legislation with the federal act." The dairy and food commissioner and the director of the agricultural experiment station are authorized "to adopt, so far as applicable, the regulations from time to time promulgated under the federal act and to make the regulations promulgated under this act conform, so far as practicable, with those promulgated under the federal act."

Provisions for injunction proceedings, seizure and emergency permit control are included in the act. Section 12 on adulterated food and Sec. 13 on misbranded food are practically identical with the corresponding sections of the federal act. Exemptions regarding the coloring of citrus fruits and the coloring of butter, cheese and ice cream, contained in the federal act, are not given in the new Connecticut law.

Connecticut Sec. 13 also has added to it the provision on misbranding: "a food for which no definition and standard of identity and no standard of quality have been prescribed by regulations as provided by section eleven, and it shall fail below the standard of purity, quality or strength which it purports or is represented to possess."

There is one point that is to be noted in the new Connecticut law. The word "sale", as defined by Chap. II on definitions, "shall mean any and every sale and shall include (1) manufacture, processing, packing, canning, bottling or any other production, preparation or putting up; (2) exposure, offer or any other proffer; (3) holding, storing or any other possessing; (4) dispensing,

CAPITAL VIEWS

SALES TO UNCLE SAM — The Senate has voted to apply the Walsh-Healy law to contracts for sales to the government of as little as $4,000 worth of goods. That means that any one selling to Uncle Sam as much as this on a single contract must guarantee that he meets the Wagner labor relations act and complies with certain other restrictions, including opening his books to government investigators. Selling food products to any government agency may be less satisfactory if the House approves this revised law.

FIRST FOOD STANDARDS—Canned tomatoes, tomato puree and tomato paste were defined by standards of identity issued under the new food and drug law by order of the Secretary, published July 18. These standards will take effect the first of next January unless in some way modified meantime. Although important pioneers in the matter of standard making, these commodity definitions dodge the principal controversial problems that are now troubling the Secretary and the Food and Drug Administration. The corn sugar-cane sugar battle is not yet settled.

IF WAR—The first serious impact of European war on American food industries would be in transportation troubles. This conclusion grows daily more clear in Washington. One recent action that will pinch many companies needing foreign raw materials or doing export business is the British decision for a "ministry of marine." Such agency in event of war would control all British shipping, which means pretty much all shipping of concern in moving goods to and from America. Larger than normal reserves of raw materials from abroad may be necessary as a safeguard.

MILK MEN FREED—The government's case against 57 individuals, companies and organizations in the milk industry collapsed in Chicago when Judge Woodward ruled that they were no longer under the jurisdiction of the Sherman antitrust law. In effect, the judge said: "The production and marketing of agricultural products, including milk, has, so far as interstate commerce is concerned, been removed from the sphere of trade and barter in a free agency to a status of dependence and obedience to the supreme, exclusive and plenary control of the Secretary of Agriculture, subject to judicial review in the mode prescribed by the statutes."

If the Department of Justice cannot put these milk folks back under the antitrust laws by court appeal, they will certainly go to Congress where they are likely to get a new statute of that effect. The problem still remains as to how to prevent one department from authorizing an action for which another department tries to put a man in jail. Business men would certainly welcome an answer to this as much as the government prosecutors.

DUST DANGERS—The required practice of handling dusty grain for weighing before it can be cleaned probably caused the disastrous elevator explosion in Chicago on May 11. This is substantially the conclusion of the government's own chemical engineering investigators. They carefully avoid criticizing laws which practically compel food plants to handle dangerous dusts; but their hope for elimination of this required practice is obvious. Incidentally, they compliment food plants, such as flour mills, starch factories and sugar refineries, which have taken effective preventive measures against such fires and explosions.

giving, delivering, serving or any other supplying; and (5) applying, administering or any other using."

California Law Approved

California has enacted a foods act, which has become Chap. 3 of Div. XXI of the Health and Safety Code, added by Assembly Bill No. 1831. The act was approved July 15, and it will become effective on Jan. 1, 1940.

Although fairly consistent with the Federal sections on adulteration and misbranding, the California chapter grants an exemption from the required ingredient listing to carbonated beverages. Such exemption is allowed when ingredients have been fully and correctly disclosed by sworn affidavit to the state board of public health.

The regulations promulgated and the definitions and standards prescribed by the California board shall not be higher nor more restrictive than those promulgated by the United States Secretary of Agriculture.

CONVENTIONS

AUGUST

8–11—International Apple Association, Netherland Plaza Hotel, Cincinnati.
23–26—National Food Distributors Association, Hotel Sherman, Chicago.
27–30—International Brewers Congress, Zurich, Switzerland.
28–31—Associated Coffee Industries of America, Pennsylvania Hotel, New York.
31—American Cranberry Growers Association, Pemberton, N. J.

SEPTEMBER

2–9 —Third International Congress for Microbiology, Waldorf-Astoria Hotel, New York.
11–15—American Chemical Society, fall meeting, Boston, Mass.
18–20—Super Market Institute, Cincinnati.
26–29—American Association of Food and Drug Officials of the United States, Hartford, Conn.

Labor Board Revises Rules

Employers are granted more flexibility in settling their labor troubles under new rules and regulations formulated by the National Labor Relations Board. Effective on July 14, the regulations permit employers to petition the Board in representation cases where two or more labor organizations are claiming a majority but neither petitioned the Board for certification. Several other changes of lesser importance were included in the new rules, which were published in the *Federal Register*.

Proposes New Standards For Grades of Tomatoes

A proposed revision of the United States standards for grades of canned tomatoes has been issued by the Agricultural Marketing Service of the Department of Agriculture. The proposed revision covers standard of identity, grades, definition of terms and the method for determining the score for each factor of quality. The grades include U.S. Grade A or U.S. Fancy, U.S. Grade B or U.S. Extra Standard, U.S. Grade C or U.S. Standard and Substandard. The method proposed for scoring the tomatoes allots 25 points

Schedule of Action on Food Standards

	Docket number and commodity	Type of Standard or regulations	Presiding officer	A First announced in Fed. Register	B Initial hearing date	C Preliminary briefs due not later than	D Examiner's findings published in Fed. Register	E Secretary's order published in Fed. Register	F Effective date of order
1-A	Tomato puree			Dec. 15, '38	Jan. 16, '39	Feb. 27, '39	April 4, '39	July 18, '39	Jan. 1, '40[6]
1-B	Tomato paste	Identity ..	J. M. Fox...	Dec. 15, '38	Jan. 16, '39	Feb. 27, '39	April 4, '39	July 18, '39	Jan. 1, '40[6]
1-C	Tomato catsup			Dec. 15, '38	Jan. 16, '39	Feb. 27, '39	April 4, '39	.....	.....
1-D	Tomato juice.....			Dec. 15, '38	Jan. 16, '39	Feb. 27, '39	April 11, '39	.....	.....
2	Canned tomatoes ..	Identity, quality, fill, substandard labeling.	J. M. Fox...	Dec. 15, '38	Jan. 15, '39	Mar. 10, '39	April 12, '39	July 18, '39	Jan. 1, '40[6]
3-A	Eggs								
3-B	Liquid whole eggs...			Dec. 15, '38	Jan. 23, '39	Mar. 13, '39	May 10, '39	July 20, '39	Oct. 17, '39[6]
3-C	Liquid mixed eggs...			Dec. 15, '38	Jan. 23, '39	Mar. 13, '39	May 10, '39	July 20, '39	Jan. 1, '40
3-D	Frozen whole eggs...				Jan. 23, '39	Mar. 13, '39	May 10, '39	July 20, '39	Jan. 1, '40
3-E	Dried whole eggs....	Identity ..	J. M. Fox...	Dec. 15, '38	Jan. 23, '39	Mar. 13, '39	May 10, '39	July 20, '39	Jan. 1, '40
3-F	Egg yolk.....			Dec. 15, '38	Jan. 23, '39	Mar. 13, '39	May 10, '39	July 20, '39	Jan. 1, '40
3-G	Frozen egg yolk.....			Dec. 15, '38	Jan. 23, '39	Mar. 13, '39	May 10, '39	July 20, '39	Jan. 1, '40
3-H	Dried egg yolk.....			Dec. 15, '38	Jan. 23, '39	Mar. 13, '39	May 10, '39	July 20, '39	Jan. 1, '40
4	Coal-tar colors.....	Listing and certification	F. S. Hassell	Jan. 7, '39	Feb. 6, '39	Mar. 3, '39	April 8, '39	May 9, '39[1,5]	May 9, '39[2]
5-I	Canned peaches.....			Mar. 7, '39	April 10, '39	May 26, '39	.....	.....	.....
5-II	Canned apricots ...	Identity,		Mar. 7, '39	April 10, '39	May 26, '39	.....	.....	.....
5-III	Canned pears.....	quality, fill	J. M. Fox...	Mar. 7, '39	April 10, '39	May 26, '39	.....	.....	.....
5-IV	Canned cherries.....			Mar. 7, '39	April 10, '39	May 26, '39	.....	.....	.....
6	Canned peas	Identity, quality, fill	J. M. Fox...	Mar. 7, '39	April 17, '39	May 29, '39	.....	.....	.....
7-A	Cream.....								
7-B	Whipping cream .			Mar. 28, '39	May 1, '39	July 17, '39	.....	.....	.....
7-C	Evaporated milk....	Identity ..	F. S. Hassell	Mar. 28, '39	May 1, '39	July 17, '39	.....	.....	.....
7-D	Sweetened condensed milk.....			Mar. 28, '39	May 1, '39	July 17, '39	.....	.....	.....
7-E	Dried skim milk ..			Mar. 28, '39	May 1, '39	July 17, '39	.....	.....	.....
8	Canned vegetables	Identity ..	F. S. Hassell	Mar. 28, '39	May 1, '39	July 17, '39	.....	.....	.....
9	Coal-tar colors[4].....	Amendment of regulations promulgated by order of May 9 (Docket 4)		Mar. 24, '39 June 3, '39	April 24, '39 July 5, '39	June 19, '39[3] July 20, '39	.....	.....	.....

[1] Typographical errors corrected in Fed. Register, June 3, '39.
[2] Extended from June 8, '39.
[3] Emergency declared to exist, order effective on publication.
[4] Amending order of Docket 4.
[5] See also Docket 9.
[6] No definition or standard ordered for eggs: definition included for each egg product.

Procedure for Fixing Standards for Foods

Standards of identity, standards of quality, standards of fill of container and specifications for substandard commodities are fixed by the Department of Agriculture according to the following routine (letters at beginning of paragraphs correspond to letters at top of columns in accompanying table):

A. Announcement is published in the *Federal Register* giving tentative form of standards, date and place of initial hearing, presiding officer (examiner) and scope of proceedings.

B. The hearing is held and the examiner prepares and files transcript of record.

C. Announcement is published in the *Federal Register* of the latest date at which briefs in argument or proposed findings of fact, or both, may be submitted by any interested party.

D. Examiner formulates, on the basis of the hearing and briefs, findings of fact and suggested standards. These are published in the *Federal Register*, and a copy is sent to each of those for whom appearance was entered at the hearing. Within ten days after receipt of this copy any person who wishes may file objection to the suggested findings of fact or standards with the hearings clerk of the Department of Agriculture.

E. Secretary reviews case and publishes his order in the *Federal Register*, establishing the standards.

F. Standards take effect at some named date thereafter, not sooner than 90 days following the publication except in case of emergency.

Further protest or appeal from the order of the Secretary may take the form of (*a*) comments to him, on the basis of which the case may be ordered reopened, or (*b*) petition to the proper Circuit Court of Appeals of the United States within 90 days of issue of Secretary's order.

each to drained weight, wholeness, color and absence of defects.

As soon as this proposed standard becomes a tentative standard, it will be published in FOOD INDUSTRIES, together with the colors used in grading the tomatoes. Tentative standards for grades of frozen peas were published in July.

Revamps Marketing Service

Improvement in the agricultural marketing services given to the food industries by the Federal Government is seen in the establishment of the new Agricultural Marketing Service by the Department of Agriculture. Announced at the opening of the current fiscal year, the new service is under the charge of C. W. Kitchen, and will administer related activities transferred under the direction of Secretary Wallace from four bureaus of the department.

The activities taken over from the Bureau of Agricultural Economics are market research, service and regulatory work in connection with dairy and poultry products, fruits and vegetables, grain, livestock, meats and wool, hay feed and seed, tobacco, warehousing, market news service, cotton and all of the work on crop and livestock estimates.

From the Bureau of Animal Industry, the new service takes over administration of the Packers and Stockyards Act, from the Bureau of Plant Industry, administration of the Federal Seed Act, and from the Bureau of Dairy Industry, administration of the Dairy Export Act.

AGMA Adopts Simple Forms of Guaranty

Simple forms of guaranty of compliance with the Federal Food, Drug and Cosmetic Act have been adopted by Associated Grocery Manufacturers of America. For use by manufacturers supplying distributors with grocery products, the forms are as follows:

Invoice guaranty — The undersigned hereby guarantees that no article listed herein is, when shipped or delivered by the undersigned, (*a*) adulterated or misbranded within the meaning of the Federal Food, Drug and Cosmetic Act, to the extent said Act is then effective and applicable, or an article which may not, under the provisions of Sec. 404 or 505 of said Act, be then introduced into interstate commerce; (*b*) adulterated or misbranded within the meaning of any identical or substantially similar state or municipal law, on the subject, to the extent said law is then effective and applicable.

Individual guaranty—The undersigned hereby guarantees that no article hereafter shipped or delivered by it to (insert name and post-office address of dealer) is, when so shipped or delivered by the undersigned, (*a*) adulterated or misbranded within the meaning of the Federal Food, Drug and Cosmetic Act, to the extent said act is then effective and applicable, or an article which may not, under the provisions of Secs. 404 or 505 of said Act, be then introduced into interstate commerce; or (*b*) adulterated or misbranded within the meaning of any identical or substantially similar state or municipal law, on the subject, to the extent said law is then effective and applicable. This is a continuing guaranty, subject to revocation on written notice thereof.

In the June issue, FOOD INDUSTRIES published, on page 355, suggested forms of guaranty recommended by the Joint Conference of Canners and Distributors. One form was for inclusion in sales contracts for specific sales, and another form was to be used where a continuing or blanket guarantee was desired. Neither form includes the provision of the AGMA guaranties pertaining to state and municipal laws.

Correction on Use Of Lactic Acid in Pickles

In the article, How to Use Lactic Acid in Finishing Pickles and Pickle Products, FOOD INDUSTRIES, June, 1939, there appeared in the first column on page 325 this statement: Hans J. Jerne of Wassenaar, Netherlands, was granted a British Patent (No. 474,905) Dec. 9, 1937. This patent has not been granted, and the date of acceptance of the specification was Nov. 9, 1937. The patent was opposed and there has not yet been a decision.

Construction News

	Pending (thousands)	Awarded July (thousands)	Total Awarded 1939 (thousands)
Bakery	$389	$70	$824
Beverages	278	286	4,288
Canning and Preserving	.....	.....	200
Confectionery	.....	.....	75
Grain Mill Products	140	150	2,765
Ice Manufactured	.....	.....	295
Meats and Meat Products	40	.....	457
Milk Products	80	.....	901
Miscellaneous	430	585	2,144
	$1,357	$1,091	$11,949

FTC Drops Ice Cream Case

FTC has brought to an end, "without prejudice," its case against International Association of Ice Cream Manufacturers in Washington, its member companies and officers, charging restraint of trade in interstate commerce and discouragement of the use of counter freezers. The Commission reserves the right to reopen the case should future facts warrant such action.

Food Business Better

Net earnings reports of companies in the food industries show encouraging advances when compared to similar reports for 1938. General Foods Corp. reports earnings of $7,574,584 for the first six months of 1939, compared to $6,193,578 for the first six months of last year. This was an increase of about 22 per cent.

For the year ending June 30, 1939, National Biscuit Co. reported net profit of $12,256,499, compared to $12,117,455 for the preceding year. This was a gain of about 1.2 per cent.

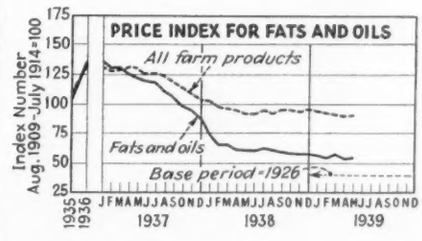
Composite earnings of a group of 33 food companies for the first quarter of 1939 were $25,214,337 compared to $23,758,387 for the first quarter of 1938. This was a gain of approximately 8.8 per cent, indicating a greatly improved outlook for food company earnings.

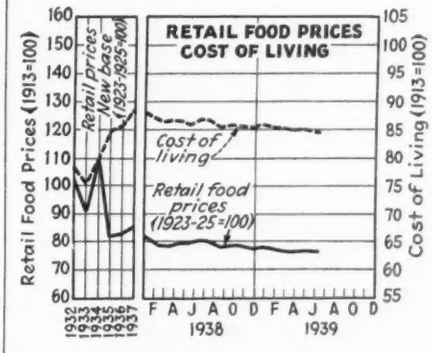
Foreign Food Trade Shows Improvement

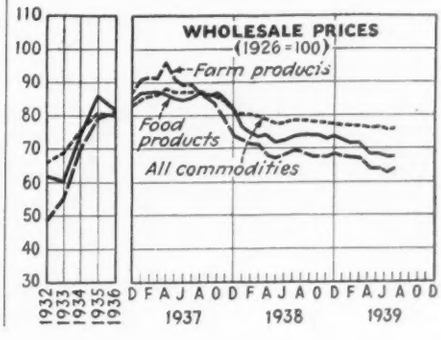
According to a survey recently released by the United States Department of Commerce, United States foreign trade in raw and processed foods has shown improvement in exports with imports remaining steady. Exports average slightly above $200,000,000 for the four years from 1933 to 1936. In 1937, exports were $280,000,000, while in 1938 a figure of $430,000,000 was recorded. Imports of foods in 1938 were $570,000,000, approximately equal to the average of the 1933-1936 period.

Over one-half of the 1938 food exports consisted of grains and grain products. But the outstanding figure in these 1938 exports was shipments of fresh, dried, canned and processed fruits and vegetables valued at $109,434,000, a record figure for the last six years.

Tropical products bulk high in United States food imports, with over half the total value made up of coffee, tea, cocoa, spices and sugar. Imports of grains, meats and their products showed a distinct decline in 1938.







More Pigs, More Lard

Pigs saved in 1939 are expected to exceed by 4 per cent the annual average of 80,000,000 pigs saved during the pre-drought period, 1929-1933. As a result, the Bureau of Agricultural Economics expects lard output in 1939 to be about 2,100,000,000 lb., compared with 1,754,000,000 lb. in 1938 and a 1929-1933 average of 2,342,000,000 lb. Production of lard in 1940 is expected to at least equal the above average. Production of lard under Federal inspection in the first five months of 1939 was 18 per cent greater than in the same months of 1938.

Commodity Prices Show Little Change

In spite of flurries in the futures markets for foods, spot food commodity prices showed some increase in the period from mid-June to mid-July. The *N. Y. Journal of Commerce's* index of food prices rose in that period from 63.7 to 66.0. In contrast, reacting to the good harvest prospects, a fall from 58.1 to 54.9 was recorded by the grain index in the same month. The general commodity price index rose slightly, from 74.7 to 75.0 in this period.

Data for the Charts

In preparing the curves shown on this and the preceding page of FOOD INDUSTRIES, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* fats and oils index, Bureau of Raw Materials for American Vegetable Oils and Fats Industries.

INDICATORS

FLOUR OUTPUT in June, 1939, as reported by *The Northwestern Miller* for mills representing 60 per cent of U. S. production, was 5,588,878 bbl., compared to 5,381,976 bbl. in June, 1938.

SUGAR DELIVERIES, first five months of 1939, were reported by the U. S. Department of Agriculture at 2,380,019 short tons, raw value, compared to 2,250,216 tons for the same months a year before.

CONFECTIONERY and competitive chocolate product sales in May, 1939, were reported by the U. S. Department of Commerce at $14,837,000, up 8.1 per cent above sales for May, 1938.

PEAS canned this year are now estimated at between 15,000,000 and 16,000,000 cases, about 60 per cent below the 1938 pack.

GREEN LIMA BEAN ACREAGE planted for manufacture is now estimated at 47,790 acres, compared to 55,010 acres last year.

FISH, frozen, in storage on May 15, 1939, was 35,161,000 lb., compared to 45,981,000 lb. on the same date a year before, and an average of 32,631,000 lb. for the date.

EVAPORATED MILK PRODUCTION, first five months of 1939, is reported at 913,475,000 lb., up 3,000,000 lb., over production in the same five months of 1938, and 19 per cent above the 1933-1937 average.

BUTTER PRODUCTION, creamery, in May, 1939, was 193,701,000 lb., compared to 199,596,000 lb. a year before, and a 182,949,000 lb. average for the date in 1930 to 1937.

OLEOMARGARINE SALES in May, 1939, as indicated by sales of revenue stamps, totaled 22,938,328 lb., a drop of 22 per cent below sales of May, 1938.

FROZEN FRUITS in storage, July 1, 1939, were 103,675,000 lb., compared to 125,372,000 lb. on July 1, 1938, and a 1934-1938 average of 80,686,000 lb. for the date.

FROZEN VEGETABLES in storage, July 1, 1939, totaled 53,099,000 lb. The figure was 33,581,000 lb. a year previous.

BUTTER, creamery, in storage July 1, 1939, was 131,455,000 lb. The amount one year before was 121,467,000 lb., and the 1934-1938 average was 88,988,000 lb. for the date.

CHEESE, all kinds, in storage on July 1 this year totaled 98,439,000 lb., compared to 114,788,000 lb. on July 1, 1939, and a July 1 average (1934-1938) of 95,631,000 lb.

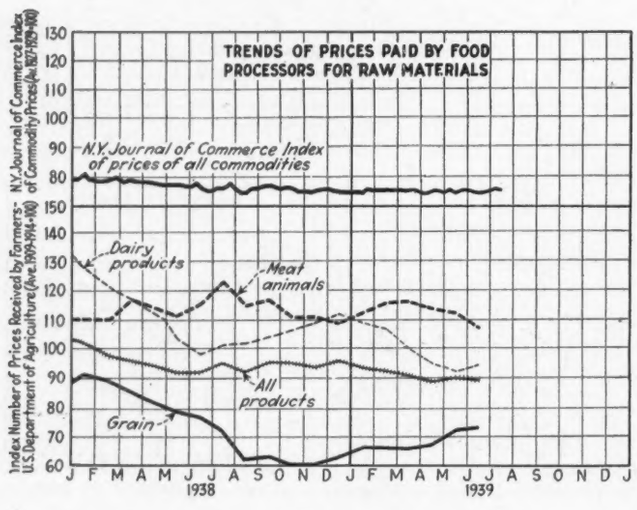
EGGS in storage, case equivalent, on July 1, 1939, totaled 10,982,000 cases. This compared to 10,212,000 cases a year before and to a 1934-1938 average of 11,336,000 cases for the date.

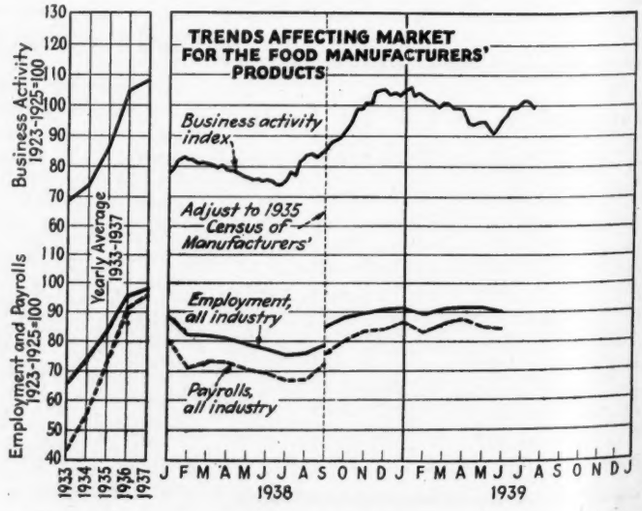
POULTRY, frozen, all kinds, in storage on July 1 of this year was 67,421,000 lb., compared to 53,432,000 lb. a year before, and an average in 1934-1938 of 52,263,000 lb. for the date.

MEAT, all kinds, in cure and frozen storage on July 1, 1939, amounted to 599,977,000 lb., compared to 515,527,000 lb. on July 1, 1938, and a 1934-1938 average of 611,170,000 lb. for the date.

LARD in storage on July 1 this year amounted to 148,169,000 lb. The quantity on July 1, 1938, was 126,066,000 lb. and the July 1 average in 1934-1938 was 139,556,000 lb.

WEEKLY FOOD PRICE INDEX of Dun & Bradstreet stood at $2.16, the lowest since June 5, 1934, and compared to $2.46 for the corresponding July date in 1938.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
Index Number of Prices Received by Farmers-U.S. Department of Agriculture (Ave. 1909-1914=100)
N.Y. Journal of Commerce Index of Commodity Prices (Av. 1927-1929=100)
J F M A M J J A S O N D J F M A M J J A S O N D J
1938
1939


TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Business activity index
Adjust to 1935 Census of Manufacturers'
Employment, all industry
Payrolls, all industry
Business Activity 1923-1925=100
Employment and Payrolls 1923-1925=100
Yearly Average 1933-1937
1933 1934 1935 1936 1937
J F M A M J J A S O N D J F M A M J J A S O N D J
1938
1939

Men, Jobs & Companies

INDUSTRY

Ballard & Ballard, Louisville, Ky., will build a flour-blending plant at Altavista, Va. The factory will measure 98 x 100 ft.

Borden Co. suffered damages estimated at $75,000 when the explosion of a 300-hp. boiler wrecked part of its plant at Arcade, N. Y.

Brown Packing Co., Philadelphia, will move its cannery to the South because of its inability to come to terms with Cannery Workers Union, according to Harry V. Brown, president. Mr. Brown said that he offered the union, a CIO organization, a 20 per cent increase, but that it refused to come to an agreement.

Double-Cola Bottling Co. has opened a new $75,000 plant at San Antonio, Tex. The building is a two-story structure, 75 x 130 ft.

Ebling Creamery Co., Detroit, suffered a loss of several thousand dollars recently when fire destroyed its plant at Clinton, Mich.

Edenfruit Products Co., Rockford, Ill., has purchased the Bowman milk plant at Poplar Grove, Ill.

Fauerbach Brewing Co., Madison, Wis., plans to construct a $175,000 bottling house.

General Mills, Inc., has awarded contracts for the construction of a cereal products building at Buffalo, N. Y., for its Washburn-Crosby division. The cost is placed at $900,000.

George A. Hormel & Co., Austin, Minn., has leased a building at Chattanooga, Tenn. The company will remodel the building and install a refrigerating plant.

Igleheart Bros., Inc., Evansville, Ind., recently purchased one of the two milling properties of Bernet, Craft & Kauffman Milling Co., St. Louis.

Loose-Wiles Biscuit Co. will build a two and three-story addition to its baking plant at Saginaw, Mich.

Michigan Sugar Co. will spend $150,000 on an expansion program at Croswell, Mich. New power plant equipment will be installed.

L. E. BOOTH

Following acquisition of Pa-Pi-A Corp., New York, by Hecker Products Corp., he was named president of the new Hecker division. Mr. Booth has been with Hecker and its predecessors during his entire business life, and was general sales manager of the company's soap division prior to its sale to Lever Bros. some months ago.

Karl F. Mogg Co., Inc., Youngstown, Ohio, meat packer, has purchased the former Standard Textile Co. plant at Girard, Ohio. The plant will be remodeled at a cost of about $200,000.

John Morrell & Co., Ottumwa, Ia., will build an addition to its packing plant at Topeka, Kan. Sausage canning, lard refining and other operations will be housed in the new building.

Peter-Cailler-Kohler Chocolate Co. will spend $75,000 to erect and equip a four-story plant at Fulton, N. Y. The new factory will be 100 x 145 ft.

Rival Packing Co., Chicago, plans to build, at a cost of $400,000, a new canned meat plant with 85,000 sq.ft. of floor space.

Stokely Bros. & Co., Indianapolis, has purchased the interest of the city of New Bedford, Mass., in the Whitman Mills textile plant. The factory, which has been idle for several years, will be remodeled and equipped for canning operations.

Verity Mills, Inc., has been organized at Buffalo, N. Y., with A. H. Kellogg Clark, director of Spencer Kellogg & Sons, Inc., as president.

Zinsmaster Breads, Inc., suffered damage estimated at $200,000 when fire destroyed its modern plant at Des Moines on July 8. The loss is reported to be covered by insurance.

PERSONNEL

Frank M. Archer has been elected president of Moxie Co., Boston, to succeed the late Francis E. Thompson. Mr. Archer has been chairman of the board and that office has been dissolved. He is also general manager.

Henry B. Arthur has been appointed economist of Swift & Co., Chicago, to succeed the late George E. Putnam, under whom he had served as assistant since 1936.

N. Betzold is now sales manager of the packaged foods division of Durkee Famous Foods, Inc., with headquarters

DR. C. O. SWANSON

Known widely for his contributions to the science of cereal chemistry, he is retiring Sept. 1 as head of the department of milling industry, Kansas State College, Manhattan. Retiring because of his advanced age, Dr. Swanson will devote his full time to research in the milling industry department of the college. He will be succeeded as head of the department by Dr. E. C. Bayfield, director of the Federal Soft Winter Wheat Laboratory, Wooster, Ohio.

in Cleveland. He formerly managed the company's Norwalk, Ohio, plant.

Carl Buskirk, Paw Paw, Mich., is the new president of Fruit Cooperative Canning Co., Coloma, Mich.

A. A. Dacey on July 1 joined Wilson & Co., Chicago, in an executive capacity. He formerly was manager of George A. Hormel & Co's beef department.

J. H. Diamond heads up National Macaroni Manufacturers Association. He is with Gooch Food Products Co., Lincoln, Neb.

A. P. Dorgan, Jr., recently became president of Dorgan Packing Corp., Mobile, Ala. The company was formerly the Dorgan-McPhillips Packing Corp.

Frederick C. Dressel has been made assistant to the president of Salerno-Megowan Biscuit Co., Chicago.

C. L. Emanuelson, Emanuelson's Bakery, New Haven, Conn., was elected president of New England Bakers Association at the convention in June.

Lon P. Flanigan, Geneva, N. Y., is the new president of National Kraut Packers Association.

H. R. Harmer, formerly secretary of Hubbard Milling Co., Mankato, Minn., has been advanced to president and will also serve as general sales manager.

Col. J. W. Keller has been elected president of Pratt Food Co., Philadelphia, to succeed his late father, J. S. Keller. He formerly was vice-president of the company.

Robert F. Keppel is the new president of Pennsylvania Confectioners Association. He is with Keppel & Rouf, Inc., Lancaster.

A. L. Leonard has been appointed manager of Armour & Co.'s branch at Columbus, Ohio. He was transferred from Reading, Pa.

Robert J. Patterson has retired as superintendent of the H. P. Hood & Sons milk plant in West Canaan, N. H. He had been with the firm 37 years.

R. M. Peot has been named manager of the Oshkosh, Wis., branch of Swift & Co., succeeding E. L. Haslam, retired.

W. E. Roys has been appointed plant manager of Foulds' Milling Co., Libertyville, Ill., a subsidiary of Grocery Store Products Co. Mr. Roys temporarily managed the Foulds' plant several years ago and later was associated with the Jacob Mushroom Division of Grocery Store Products. G. G. Hoskins, formerly manager of the Foulds' plant, resigned.

A. F. Stender, plant superintendent of the Antigo (Wis.) Milk Products Cooperative, has been named manager of the Marathon Cooperative Dairy Association plant at Wausau, Wis.

DEATHS

George M. F. Arnold, 91, who retired only five years ago as head of Arnold Vinegar Co., Oshkosh, Wis., July 1. He had served as head of the vinegar company for 60 years.

Richard S. Castle, 36, vice-president and general manager of United Packing Corp., Oakland, Calif., died June 28 in an automobile accident.

William J. Cawley, 53, vice-president of Wilson & Co., Chicago, June 25. For fifteen years he was manager of the company's foreign business.

Louis P. Christophersen, 67, president of the St. Louis Coffee & Spice Mills, June 24, following a paralytic stroke. He founded the coffee firm about 40 years ago.

Hugh M. Dunlop, 71, for twenty years president of Dunlop Milling Co., Clarksville, Tenn., June 28.

Morris Friend, 80, last of the four founders of Beatrice Creamery Co., recently, at Lincoln, Neb. He was the first secretary of the company, in 1909, and has been an officer and director since.

Hunt Henderson, 67, senior partner in the Henderson Sugar Refinery, New Orleans, June 21. He was associated with the sugar industry all of his business life.

Frank P. Holmes, 80, vice-president of Stratton & Co., Concord, N. H., June 20. He had been connected with the flour industry for more than 60 years.

FREDERICK B. CHILDS

Death from heart attack took him on July 18 at the age of 46. He was executive vice-president of Libby, McNeill & Libby, Chicago.

George E. Putnam, 52, noted economist and an officer of Swift & Co., June 24. He joined Swift & Co. in 1920 as consulting economist and head of the commercial research deparmtent.

Henry Quell, 72, treasurer of M. H. Renken Dairy Co., New York, June 14. He was associated with the company for more than 50 years.

Griffith R. Rice, 73, president of G. R. Rice Co., noodle manufacturers, June 23, in Milwaukee.

Ernest G. Kissling, 58, manager of the oil and lard refineries of Wilson & Co., Chicago, July 1.

Richard J. Byrne, 71, president of Wallens-Byrne Packing Corp., Buffalo, recently.

ASSOCIATED INDUSTRIES

American Maize-Products Co., New York, has appointed Paul Prentiss as assistant district sales manager of northern Pennsylvania and upper New York State. Paul Walters has been made assistant district sales manager of California.

Anchor Hocking Glass Corp. has closed its New Orleans office. The territory formerly covered by that office will be serviced by John R. Nolan out of the Houston, Tex., office.

Electric Associates, Portland, Ore., has been organized to provide representation throughout the Rocky Mountain and Pacific Coast territories for Reliance Electric & Engineering Co. and Clark Controller Co., Cleveland, and Electric Machinery Manufacturing Co., Minneapolis.

Frick Co., Waynesboro, Pa., announces that Alvin H. Baer has rejoined the company as executive assistant, with headquarters in New York.

General Electric Vapor Lamp Co., Hoboken, N. J., has been merged with the Incandescent Lamp Department of General Electric Co., forming the Lamp Department.

Leeds & Northrup Co., Philadelphia, has named Morris E. Leeds, chairman and Charles S. Redding, president. Mr. Leeds, who founded the company, had been serving as president. Mr. Redding was vice-president in charge of research and engineering.

White Motor Co., Cleveland, announces that Lincoln R. Scafe has joined the company as sales manager of the White Horse division.

Just off the Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

AIR CONDITIONING—Paul J. Vincent Co., 2208 Maryland Ave., Baltimore Md., has published "Air Conditioning and Refrigeration in Baltimore and the South", with 23 pages of illustrations of air-conditioning installations for industrial purposes.

BOTTLING MACHINERY — Label paster, Model 38; portable electric screw capper; "Labelit" Model No. 77; portable electric vacuum bottle filler; and other electric bottling machines are illustrated and described in Bulletin No. 31, by Alsop Engineering Corp., Milldale, Conn.

CANNING EQUIPMENT—A complete line of equipment, supplies and accessories for canners is illustrated and described with statistical data, specifications and applications in a 100-page indexed catalog, No. 39, published by Chisholm-Ryder Co., Inc., Niagara Falls, N. Y.

DRUM DRYERS—Atmospheric and vacuum types of drum dryers for drying solutions and slurries are discussed in 32-page Bulletin No. 316, by Buffalo Foundry & Machine Co., Buffalo, N. Y.

WEIGHER—Bulletin 592, The Fred Goat Co., Inc., 320 Dean St., Brooklyn, N. Y., describes Model 101, Type A-7, fully automatic net weigher for packaging operations, with illustrations, diagrams and application data.

VIBRATING SCREEN—Bulletin No. 239, of Productive Equipment Corp., 4600 South Kedzie Ave., Chicago, Ill., features "Selectro" vibrating screens with circle throw action adjustable to 8 different intensities.

Plant Accessories and Supplies

ACCESSORIES—The H. M. Harper Co., 2620 Fletcher St., Chicago, Ill., has published its 71-page 1939 catalogue and price list of non-ferrous and stainless steel bolts, nuts, screws, washers and accessories.

BEARINGS — Catalog 390 of the Johnson Bronze Co., New Castle, Pa. furnishes 72 illustrated pages of listings of electric motor service bearings and bushings, oil grooving and alterations, together with a comprehensive price list.

CONVEYOR BELTS — "Cambridge Belts in the Food Industry" with general information and application data on woven wire conveyor belts has been issued by Cambridge Wire Cloth Co., Cambridge, Md.

ELECTRIC CABLE—"ANW" insulated cable for moist locations and other adverse conditions is described in a recent folder by Anaconda Wire and Cable Co., 25 Broadway, New York, N. Y.

LUBRICANTS — The "300" series "Sta-Put" machine lubricants permitting "less oil, less often" and their general applications are the subject of a folder recently issued by E. F. Houghton & Co., 240 W. Somerset St., Philadelphia, Pa.

MARINE ENGINES — "Caterpillar" diesel marine engines for operation on fishing boats under heavy-duty service are described in D934-Form 5333 by the Caterpillar Tractor Co., Peoria, Illinois.

PIPES—Pipe supports, alignment guides, anchors, and saddle plates for steam or hot water lines are discussed in revised Bulletin No. 35-70B by American District Steam Co., North Tonawanda, N. Y.

PUMP—Beach-Russ Co., 50 Church St., New York, N. Y., has published Bulletin No. 72 on Type RP high vacuum pump for processing work, including drying, distillation and dehydration.

PUMPS—"Pomona Little Chief" all service turbine pump for an independent water supply system is the subject of illustrated Bulletin No. 30, published by Pomona Pump Co., St. Louis, Mo.

RECEIVERS—Form 9202 published by Ingersoll-Rand Co., Phillipsburg, N. J., describes a complete line of 23 standard air-receivers for maximum pressures of 125 to 500 lbs.

REFLECTOR UNITS—The Miller Co., Meriden, Conn., announces its new 3-light and 48 in. fluorescent daylight reflector units for industrial application, in a 15-page illustrated folder entitled "Fluorescent Lighting Fixtures."

SANITATION EQUIPMENT — "Scott Washroom Advisory Service," title of a publication of the Scott Paper Co., Chester, Pa., illustrates a plan whereby washrooms may be designed to pay.

TUBES—Bulletin No. 401 on stainless steel tubes for the elimination of corrosion and product contamination in the food industries and Bulletin No. 1-F, an analysis chart on a variety of stainless steels have been issued by Globe Stainless Steel Tube Co., 4020 W. Burnham St., Milwaukee, Wis.

VALVES—Hancock "Duravalves" for high pressure service are described in a recent bulletin by Manning, Maxwell & Moore, Inc., Bridgeport, Conn., giving a list of installations, test reports and engineering data.

WELDING EQUIPMENT—The Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio, has issued Bulletin 401-A, describing welding procedures, complete with illustrations, specifications and accessories data.

Packaging

PACKAGING MACHINERY — "The Pure-Pak Way", published by Pure-Pak Division, Ex-Cello Corp., Detroit, Mich., describes the operation of the Pure-Pak machine for forming, sterilizing, paraffining, cooling, filling, hotsealing, stapling and dating fiber containers for milk and other dairy products.

PACKAGING MACHINERY — "Packomatic Commander", automatic ma-

chine for placing any type knocked-down container in position for packing, is described in an illustrated folder by J. L. Ferguson Co., Joliet, Ill.

Laboratory Equipment

LABORATORY HYDROMETERS—Bulletin No. 205, issued by Wm. Hiergesell & Sons, 295 Pearl St., New York, N. Y., describes and illustrates various types of "Streamline Silvertip" hydrometers for food laboratory service.

MEASURING EQUIPMENT—"Apparatus for Electrolytic Conductivity Measurements in Laboratory and Plant", is the title of a 40-page illustrated catalog EN-95, Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa., describing equipment for making electrolytic conductivity measurements.

MICROSCOPES—Bausch & Lomb Optical Co., Rochester, N. Y., announces milk plant microscope outfits, dairy microscopes and accessories, designed to permit checks at the source of supply, and control and analysis in the dairy plant laboratory, in a recent bulletin.

SACCHARIMETERS—Bausch & Lomb Optical Co., Rochester, N. Y., describes its half-shadow saccharimeter, built to accommodate tubes up to 400 mm. in length, in a recent 4-page folder.

WATER ANALYSIS—W. H. & L. D. Betz, 235 W. Wyoming Ave., Philadelphia, Pa., has published the fourth edition of the Water Analysis Manual, describing standard tests and new methods of analyses.

Materials of Construction

CABLES—Publication No. C-42 of Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y., gives technical data, descriptions, applications and physical and electric properties of rubber insulated electric power cables.

CORROSION-RESISTANT COATINGS—Amercoat Sales Agency, 5905 Pacific Blvd., Huntington Park, Calif., has issued a 12-page illustrated booklet on the uses and application of various types of "Amercoat" cold-applied corrosive resistant plastic coatings.

METAL PRODUCTS—Allegheny Ludlum Steel Corp., Pittsburgh, Pa., has issued the first copy of "Steel Horizons," a new house publication, giving pictorial and editorial presentations of its new products and fabrications.

MONEL METAL — "Engineering Properties of Monel", title of the 1939 edition, 11-page Bulletin T-5 of The International Nickel Co., 67 Wall St., New York, N. Y., contains revised information on mechanical properties, complete with statistics, charts, characteristics and listings of other available technical bulletins on Monel, nickel and nickel alloys.

STEEL CASTINGS—Smith Steel Foundry Co., 1320 S. First St., Milwaukee, Wis., has issued a 4-page illustrated pamphlet showing a series of typical stainless steel castings and listing six commonly used alloys.

Miscellaneous

BLUE PRINT MACHINE—Electronic Products Manufacturing Corp., 208 W. Washington St., Ann Arbor, Mich., has issued an illustrated folder on the "Elpro Portable Printer" for making blue line prints in 1 to 5 minutes.

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on the

INDUSTRIAL CARBURETOR

. . . but No One Does!

No, sir . . . not when it saves money, saves fuel and permits more rigid standards of quality and uniformity in baking, roasting, high temperature cooking and can making.

At this very moment Kemp Industrial Carburetors are premixing gas and air for *complete* combustion (without secondary air at the burners) in scores of the nation's greatest food plants . . . and saving from 15 to 50 per cent in fuel over previous heating methods. More savings look just as good to the comptroller as more sales. You are cordially invited to investigate. Write The **C. M. Kemp Mfg. Co., 405 East Oliver Street, Baltimore, Maryland.**

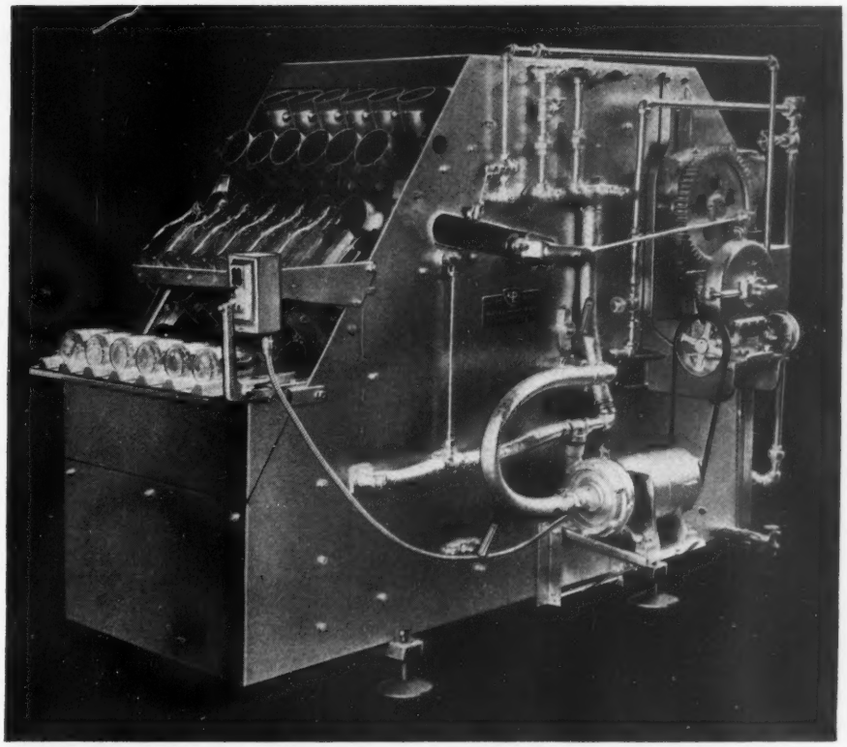
KEMP of BALTIMORE

Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Soaker Bottle Washer

CREAMERY PACKAGE MFG. CO., 1243 W. Washington Blvd., Chicago, Ill., recently introduced the "Bantam" soaker type bottle washer. This unit is designed to make soaker washing available to milk plants of small capacity, handling around 500 qt. per day. It is a six-row machine. Clean bottles are discharged entirely out of the pockets, in order to speed up hand pick-off. Automatic discharge to conveyor can be provided if desired. Floor space is 93x50⅜ in. Capacity is 16 to 24 bottles per minute.



Small soaker type bottle washer

Glass Fiber Packing

GOETZE GASKET & PACKING CO., New Brunswick, N. J., has developed a woven glass fiber gasket for the construction of acid resistant seals. These gaskets are said to be soft, pliable, resilient and will resist all acids except hydrofluoric acid.

Also, the company has developed packings from the same material for use in pumps, valves and similar applications where the non-abrasive and acid-resistant features are desirable.

Safety Leg Guard

IN THE ACCOMPANYING PHOTOGRAPH is shown a shin protector which it is claimed can be worn with comfort by the worker. It is made of fiber and formed to the contour of the leg. Its purpose is to protect workers handling boxes or other heavy loads from leg injuries. In designing it, rubber cushions have been applied between the guard and the wearer's clothing, in order to act as shock absorbers and to increase the comfort of wearing. This device is made by Ellwood Safety Appliance Co., Ellwood City, Pa.

Fiber leg guard for factory workers

Batch Mixer

CHERRY-BURRELL CORP., 427 W. Randolph St., Chicago, Ill., is manufacturing the "Mix Maker", a unit for batch mixing and pasteurizing of ice cream. This is a 500-gal. round machine, having a capacity when full of 578 gal. It is constructed of steel plate with lining and covers of stainless steel: Insulation is 2 in. of corkboard between the outside jacket and the steam jacket. Heating is provided for by means of a 3-in. steam header in the bottom of the tank.

Mixing in this mixer is accomplished by means of a three-blade stainless steel propeller driven from a two-speed gearhead motor mounted on the top of the tank.

Cold Milk Filter

JOHNSON & JOHNSON, New Brunswick, N. J., is making the "Rapid-Flo Frigid" filter for filtering milk at 40 deg. F.

The object of this filter is to enable the milk to be filtered before heating or pasteurization, in order that any dirt in it may be removed before it dissolves.

The unit embodies a strainer for removing coarse particles. After the milk has passed this strainer, it is pumped upward through a filter cartridge in which the final filtering is completed. This cartridge is made of a number of sheets of fibrous cotton, held between paper grids. The

grids and the cotton sheets are held together with paraffin wax in a solid unit which is impervious to lateral flow and consequently forces the milk to pass through the filter unit. The paper grids are made with a multiplicity of ½-in. square holes die-cut in them, thus providing vertical channels through which the milk flows. In its flow, the milk is forced through each succeeding layer of the cotton fibers.

The cotton fiber sheets used in making this filter are made of individual fibers greater in length than the openings in the grids. In this way the fibers span the openings and are securely locked in position.

The individual layers of cotton are thin enough to permit ease of flow and set up little resistance to the passage of the milk. The pressure developed during filtering depends on the amount of sediment present and the viscosity of the milk. The fiber sheets are able to withstand pressures up to 35 lb., developed from such causes.

Modern to the nth degree

AND BUILT TO LAST!

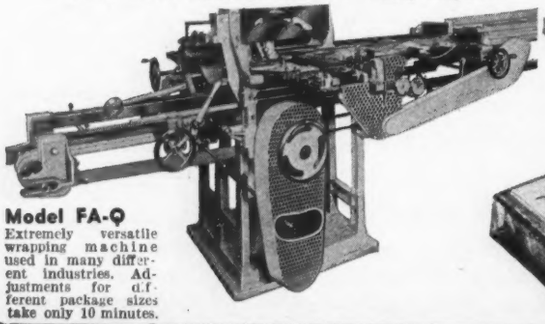
When you choose wrapping machines, you want the most modern, advanced features to meet your modern wrapping requirements . . sure. But you also want machines that *last*. You want high speed to get production out on time, to save labor and operating costs . . certainly. But you also want machines that will stand up under this high speed, won't vibrate themselves to rattlely old age in a few years.

In many plants you will find veteran Package Machinery Company machines, 20 odd years old, still doing a fine wrapping job. That's evidence of sound construction and good design. Our new machines, built to the same high standards, offer as many, if not more, potential years of trouble-free service.

Illustrated are two of our new and widely used models.

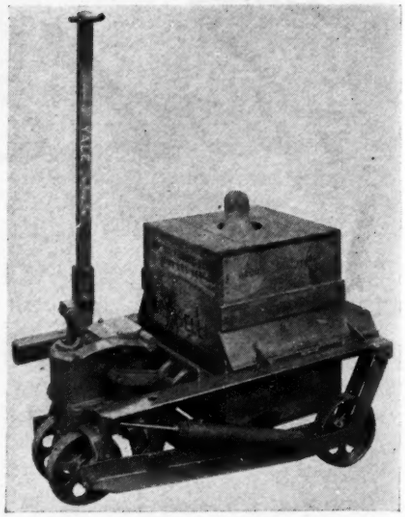
Model CM-2
New high speed wrapping machine for comparatively small size packages. Adjustable for various sizes. Speeds up to 380 per minute.

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS
NEW YORK CHICAGO
CLEVELAND LOS ANGELES
Peterborough, England: Baker Perkins, Ltd.
Mexico, D. F., Apartado 2303
Melbourne, Australia: Baker Perkins Pty., Ltd.
Buenos Aires, Argentina: David H. Orton, Maipu 231



Model FA-Q
Extremely versatile wrapping machine used in many different industries. Adjustments for different package sizes take only 10 minutes.

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines



Hand lift truck for handling carboys

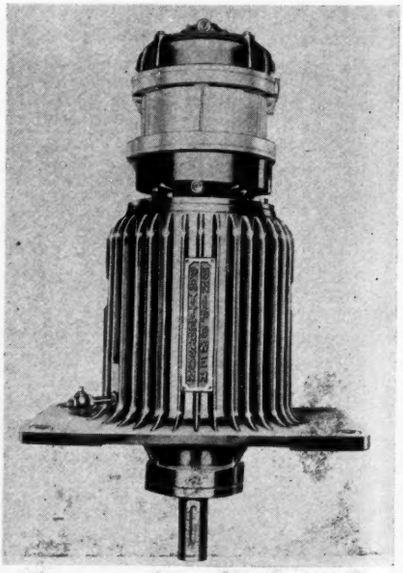
Lift Truck for Carboys

YALE & TOWNE MFG. Co., 4530 Tacony St., Philadelphia, Pa., has developed a special design of hand lift truck for picking up and transporting carboys.

This truck is designed with a special lifting frame which straddles the carboy and which has wing attachments on the top that can be adjusted to take care of variations in carboy width. The accompanying photograph shows this arrangement clearly.

Agitator Drive

PATTERSON FOUNDRY & MACHINE Co., E. Liverpool, Ohio, has developed a new drive unit for agitators, of the type where the driving motor is mounted on top of the agitation tank. In this unit a guide bearing has been



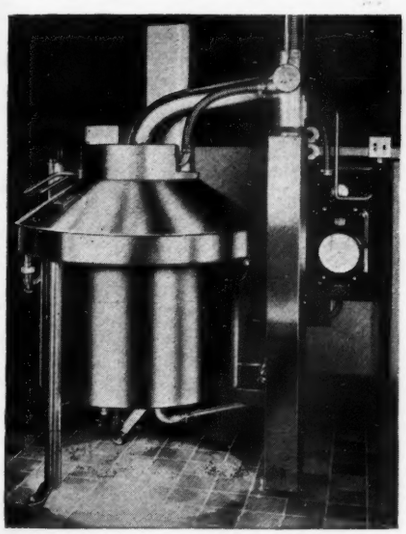
Agitator drive

built into the base in order to take care of the side thrust and torsion of the mixer shaft. It is equipped with ball bearings throughout and has hardened and ground gears of spiral type. Lubrication is from an oil reservoir by means of a dual plunger type pump.

This unit is built in all sizes up to 50 hp. and in a wide range of speeds to meet the needs of any application.

Milk Irradiator

NATIONAL CARBON CO., Cleveland, Ohio, has designed the Type YN milk irradiator, a new design with capacity for irradiating from 5,000 to 17,000 lb. of fluid milk per hour. The irradiator is equipped with a three-phase carbon arc lamp, a new development in ultra-violet ray generation. This lamp is said to require less current for operation than some other types and, at a power rate of 1 cent per kw.-hr., the operating cost for carbon and power is claimed to be but .006 cent per quart of fluid milk activated to a potency of 135 U.S.P. units.



Irradiating unit for milk

The irradiator was developed in cooperation with the Wisconsin Alumni Research Foundation, to provide an irradiating unit of high capacity, sanitary construction, economic operation and small space requirement. It consists of a stainless steel drum of cylindrical form with an annular trough on the top from which milk flows in a thin film down the inner surface of the drum. The three-phase carbon arc lamp is supported in a central position within this drum, providing the radiation or activation of the milk during its passage through the cylinder. Milk is fed to the irradiator by gravity flow from a constant head tank, and there is an arrangement for even distribution of the milk around the cylinder walls to provide uniform flow throughout the entire circumference. The floor space required is 5 x 7 ft., which gives ample working space around the unit.

Shipping Container Sealer

BETTER PACKAGES, INC., Shelton, Conn., has developed the Model 30 Conveyor-Taper. This is a machine for automatically folding down the partly closed flap and automatically sealing the top and bottom of a standard one-piece fiber shipping box and of certain other types of containers. Sealing is accomplished by applying a strip of tape over each center seam and providing a tape overlap of about 3 in. on each end of the box. The machine works on boxes made of either corrugated board or solid fiberboard. In operation, no attendance is required except for packing the boxes or for changing the machine to accommodate varying sizes of box.

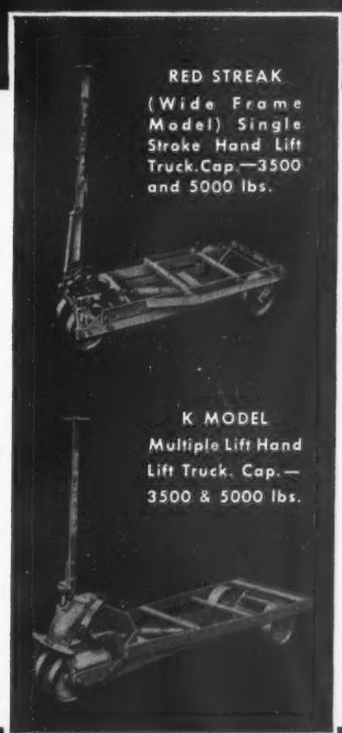
This Conveyor-Taper is designed

A YALE STORY OF SAFETY

That's what happens every time a load is lowered on a Yale Hand Lift Truck—Check and Double Check! For the Yale Release Check has a concentrated cushioning action that makes it doubly efficient—a safety factor that always protects load, truck, operator and floor.

A bronze bushing guides the high carbon ground piston rod—keeps it from buckling. In addition, there is an extra capacity oil reservoir with an automatic oil seal that prevents leakage. Once the oil is in, it stays there. And as a final indicator of the Yale Release Check's quality manufacture, there is the highly precisioned automotive type piston ring.

With this check on the job the load is never dropped—It's gradually lowered!


RED STREAK
(Wide Frame Model) Single Stroke Hand Lift Truck. Cap.—3500 and 5000 lbs.
K MODEL
Multiple Lift Hand Lift Truck. Cap.—3500 & 5000 lbs.

YALE

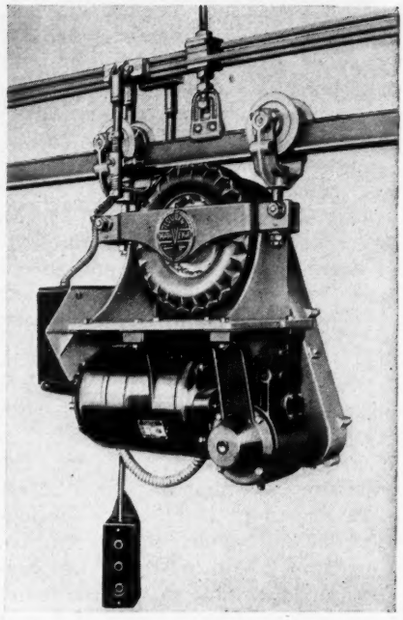
THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

for installation in a conveyor line, but can be used for hand feed at a packing table. It comes in three models, A, B, and C, with a range in box width from 6 to 16 in. minimum and from 15 to 26 in. maximum. Box lengths accommodated are from 10 to 33 in. Capacity, depending upon the dimensions of the box, is from 6 to 12 boxes per minute. Drive is by means of a standard ½ hp. motor through a worm gear reducer. Overall dimensions are 10 ft. long, 4 ft. 6 in. high and from 49½ to 57½ in. in width.

In addition to the above standard models, variations are available for sealing top only or bottom only.

Overhead Handling Device

LOUDEN MACHINERY Co., Fairfield, Iowa, has developed the "MotoVeyor", a powered machine for automatically transporting loads over an overhead track system. The device will go up or down inclines and is designed to maintain a uniform speed on downgrades. Its speed can be varied from

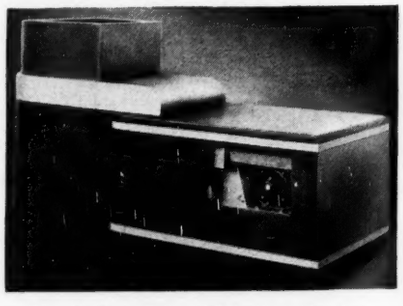


Overhead materials handling device

60 to 600 ft. per min. When desired, it is provided with a cab or step so that the operator can accompany the load being moved.

Feeding and Weighing Device

JEFFREY-TRAYLOR DIVISION, Jeffrey Mfg. Co., Columbus, Ohio, has developed a new design of "Waytrol" electric vibrating feeder and weighing mechanism. This device incorporates an electric vibrating feeder, synchronized to a continuous weigh belt and inclosed in a dustproof case, the



Feeding and weighing mechanism

only opening of which is a window to view the calibration of the weighing conveyor scale. By control of the amplitude of the feeder stroke, the amount of material fed to the belt conveyor is accurately regulated. The conveyor itself is one arm of a weighing scale, and variations in material fed immediately cause the feeder to speed up or slow down, through the action of this scale.

A uniform flow of material at hourly rates from a few pounds to 100 tons can be obtained with this device. It has been designed for

Two more TOUGH Cleaning Problems MADE EASY with Oakite Cleaning

OIL PACKER CLEANS FLOORS EASILY

Cleaning of the concrete floor under the can filling apparatus in one olive and cotton seed oil packing plant is no longer a difficult problem as it was previously. No more scraping . . . or long tedious brushing. All that is needed now is to wet down the floor with water and a small amount of an Oakite material, allow to soak, swab the floor lightly and then flush away. No trace of oil is left on the floor surface.

ALGAE GONE FROM WATER COOLING TOWER

Control of algae in the water cooling tower, and control of slime in the air washers of one West Coast citrus packing plant was a problem until a short time ago. Now the use of Oakite Airefiner eliminates both troubles. Important, too, instead of weekly cleaning, monthly cleaning of equipment is now only necessary.

Have you a cleaning problem? Whatever its nature, Oakite's 30 years' successful cleaning experience can be of help to you. Write. No obligation.

Manufactured only by
OAKITE PRODUCTS, Inc., 26G Thames St., New York, N. Y.
Representatives in All Principal Cities of the U. S.

OAKITE CERTIFIED CLEANING

MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

feeding all sorts of dry material, including foodstuffs, and can be used in the continuous proportioning of several materials. It is claimed that by eliminating surges in the feed, operating capacities have been increased in some cases as much as 60 per cent through the use of this continuous flow feeder.

Label Adhesive

PAISLEY PRODUCTS, INC., 1770 Canalport Ave., Chicago, Ill., has developed "Grip-Tite" label paste. This adhesive is designed to hold dependably to practically any surface under almost any conditions of temperature, atmosphere or climate. The manufacturer states that it has been demonstrated successfully on plain lacquered and lithographed surfaces of tin, iron, copper, brass, lead, aluminum, stainless steel, Bakelite, hard rubber, tile, leather, wood, paperboard, porcelain, glassware, galvanized ware and plastics.

The product is available in 1 gal., 5 gal., 30 gal. and 50 gal. containers and can be procured from the Chicago address or from the same company at 630 W. 51st St., New York City.

State Regulations

(*Continued from page* 448)

with all the states vigorously promoting all home state products.

There should be no blanket condemnation of the methods and advertising copy of all the states which have employed large advertising campaigns to promote local farm products. However, the methods and advertising copy of some of the states have been such as to provoke retaliatory action on the part of "sister" states.

"Buy at home" campaigns, whether conducted by states or nations, are in essence boycotts. They foment reprisals. They serve as trade barriers, often more effectively than do tariff walls.

When one state proclaims to the residents of other states that its oranges contain more vitamins and more juice, or that the best canned grapefruit juice comes only from that state, or that only from grapefruit juice from that state can one get the real grapefruit juice flavor, it is an invitation to battle with "no holts barred." When sovereign states boast to other states that their apples are best—or that the eggs contain more vitamins, those states infer that the products of other states are inferior. Inevitably, this invites reprisals which erect more and bigger walls in the paths of free trade. The United States is even now 48 dis-united states.

We hear much about the need for good industrial relations and good public relations. Isn't it about time to hear about some good state relations?

Refrigeration Will Improve Baking Profits

(*Continued from page* 435)

unit into the container in the central commissary, for distributing to the multiple unit store. There it is to be baked in the new container and turned over to the customer in the unit in which it is baked, which would certainly be appealing to the consumer.

Doughs (handled in the commissary in an efficient make-up manner, placed in the containers, retarded, then on the following day delivered with the packaged mixtures, unfrosted layer cakes, frostings ready-to-apply, creams, toppings, and miscellaneous baked materials of the non-perishable nature) could be quickly removed from the large refrigerator in the central plant to the refrigerator trucks and the retarding continued until arrival at the store. They could then be placed in the plug-in unit "reefer-proofer-baker" and kept on hand to be baked as hot goods are needed. With such a system it would be possible for a distributing fleet to handle larger areas on a one-delivery-per-day basis (instead of three or four deliveries now necessary with perishable finished baked goods) and the customer would be provided with an ample variety of hot fresh goods. Girls could be trained in a central training or apprenticeship school and thus, much of the work now handled in the central plant at night might be done to advantage by them in the sales unit in the day at no greater labor cost.

Very attractive stores could be built around this method of production. The work would be so simplified that it would require a minimum amount of training for the operators. Quality could be improved, stales eliminated or, at least, very materially reduced: (in case of sudden, adverse change of weather the unbaked goods would be held over for baking on the following day) and the consumption of many items not distributed through the multiple unit retail shops would automatically increase. Such a sales unit would truly be a contribution to the industry and could be rightfully called "The Bakery of the Future."

According to a carefully worked out standard plan of operation, returns on money invested would with proper management justify the investment. Three types of on-the-premises baking installations would handle the requirements for any location:

1. For large shopping centers, transient trade $1,200 to $2,000 weekly gross.
2. For medium size shopping centers, transient and neighborhood trade $600 to $800 weekly gross.
3. For small neighborhood communities, $350 to $450 weekly gross.

Formula for operating any one of the three types of units individually with all baking done on the premises of each unit

	Per Cent
Material	40.0
Labor	20.0
Rent	07.0
Sales Expense	08.0
Depreciation	05.0
Social Security, Insurance and Taxes	05.0
Operating Expense	05.0
Net	10.0
	100

Cost and Earnings of Individual Units on Basis of Volume

Cost of Intallation	Yearly Gross	Yearly Net
Unit 1		
$15,000–$16,000	$60,000–$100,000	$6,000–$10,000
Unit 2		
$7,500–$9,000	$35,000–$50,000	$3,500–$5,000
Unit 3		
$4,500–$6,000	$18,000–$25,000	$1,800–$2,500

Requirements for a business capable of $1,000,000 yearly gross, with a modern central commissary and modern multiple unit retail stores, would require an investment for remodelling, installation, and equipment, including sales units and central commissary, amounting to approximately $250,000.

Efficient operation should net 10 per cent of the gross, and return $100,000 yearly on an investment of $250,000.

Buying power and greater efficiency of operation changes the foregoing formula slightly for the multiple unit operator with a central commissary. Part of the preparation, as compared to the single unit, is done at the commissary, but all baking is done on the premises of each unit.

Formula for operating multiple sales units with distribution of finished and partially finished goods from a central commissary on basis of $250,000 investment, capable of $1,000,000 yearly gross, or $100,000 yearly net

	Per Cent
Material	35.0
Distribution	02.5
Supervision	02.5
Administration	02.5
Depreciation ($250,000 in 5 years)	05.0
Sales Unit Expense	05.0
Rent	10.0
Advertising	02.5
Direct Labor	15.0
Social Security, Insurance and Taxes	05.0
Operating Expense	05.0
Net	10.0
	100.0

The public is ready for the "Bakery of the Future."

Food Technology

(*Continued from page 456*)

makes little or no difference whether the oxidized or the reduced member of the system is used.

Atmospheric oxygen has an important part in improver action. This has been proved by comparative kneading tests in nitrogen and in air. When oxygen is available, the farinogram follows a higher energy level, reaches its maximum sooner and falls off more steeply from the maximum than when kneading is performed in nitrogen. Kneading emulsifies the gas in the dough, greatly increasing the area exposed to gas by forming a froth of fine bubbles. The result, in presence of oxygen, is an increase in protein strength, i.e., an improver effect.

The oxidation-reduction sensitivity in flour may reside in the gluten itself, but this point has not yet been proved. It may be related to the aging of gluten, resulting in loss of ductility and final embrittlement. Lecithin greatly influences the aging of gluten, and lecithin is sensitive to such fatty acids as oleic acid. These acids are very sensitive to oxidation, and may represent the unknown factor which changes gluten properties under the influence of redox systems. At any rate the lecithin-protein system in flour has an important influence on flour properties and on improver action.

Digest from "Proteins in the Flour Industry," by H. L. Bungenberg de Jong, *Chemisch Weekblad* 36, 400, 1939 (Published in The Netherlands).

Reduce YOUR MIXING COSTS THE SANITARY "LIGHTNIN" WAY

Replace Paddle Type Agitators

It has been repeatedly proved that LIGHTNIN Patented Double Action Propeller Type Mixing cuts power costs, reduces mixing time and entirely eliminates dead-spots. Complete line includes geared and direct drive portables, top entering and side entering mixers for mixing quantities from one to one million gallons.

Completely sanitary. No pockets for bacteria. Easily cleaned with hot water or steam. Sanitary sealed out-board bearing prevents oil or grease from this source contaminating mix.

"Lightnin" Variable Speed Mixers operate from 100 to 1800 R. P. M.

"Lightnin" Portable Mixers (geared and direct drive) range in size from 1/30 to 10 H. P.

"Lightnin" Top Entering Units (geared and direct drive) for open or closed tank work including pressure and vacuum work.

"Lightnin" Side Entering Units for tanks up to 1,000,000 gals.

"LIGHTNIN" SAVES MONEY MIXING

Carbonated Beverages
Tomato Products
Fruit Juices — Jellies — Jams
Preserves — Lard — Milk
Ice Cream Mix — Milk Drinks
Buttermilk — Bakery Supplies
Soups — Brines — Syrups
Vinegar — Wines
Yeast Products — Flavorings
Fruit Pulp — Extracts
Vegetable Dyes — Baby Foods
Premixing Mayonnaise and Salad Dressings
Sherbet — Honey
Beer — Distilled Spirits
Meat Sauces — Vegetable Oils
Vegetable Butters
Mincemeat — Cod Liver Oil

MIXING EQUIPMENT CO., INC.
1043 Garson Ave., Rochester, N. Y.
Please send me:
☐ Bulletin B-65—Portable Mixer.
☐ Bulletin B-63—Top Entering Mixer.
☐ Bulletin B-62—Side Entering Mixer.
☐ Mixing Equipment Work Sheet.

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Title_____
Company_____
Address_____

MIXING EQUIPMENT CO., INC.
1043 Garson Ave., Rochester, N, Y.

MANUFACTURERS OF LIGHTNIN PROPELLER TYPE MIXERS

BEVERAGES

Ozone Better than Chlorine for Sterile Water

WHILE CHLORINATION is successfully employed for destroying harmful bacteria in municipal water supplies, it is not ideal for treating water to be used in making food products or beverages. Even a slight excess of chlorine gives the water an objectionable taste or odor. Ozonization is much preferable, with the great advantage that any excess enhances, instead of impairs, quality. The ozone soon reverts to molecular oxygen, which contributes to aeration and helps to make beverages sparkling and attractive as well as wholesome.

Ozone is an effective sterilizing agent, and with the small factory-size ozonizers now available the cost for treating water is small, less than 1 cent per thousand gallons for one part of ozone per million parts of water, under conditions and electric current costs now prevailing in England.

In addition to destroying bacteria, ozone deodorizes and decolorizes raw waters, destroys substances imparting taste, and oxidizes organic impurities. Because the chemical effects of ozone sometimes cause precipitation of impurities, ozonizers are used in conjunction with a filter such as a stone filter or kieselguhr cartridge.

Digest from "Sterilization of Water for Beverages and Foodstuffs," by Norman C. Jones, *Chemistry and Industry* 58, 48, 1939 (Published in England).

Action of Proteins in Beer

A MAJOR FUNCTION of proteins in brewing is to supply the yeast with nitrogen, but there is also a colloidal problem introduced by proteins of high molecular weight. The problem has two aspects, one favorable and one unfavorable, because the colloidal proteins greatly aid froth retention while at the same time they cause objectionable turbidity or haze.

An experimental study of turbidity and froth shows that hop tannin is an important factor, forming with barley

proteins certain protein-tannin complexes which are responsible for turbidity. The evidence, though not yet fully conclusive, indicates that these protein complexes also contribute to foam stability. While hop resins and colloidal carbohydrates also help to stabilize beer froth it is still true that the protein complexes are needed. Their removal for the sake of clarity and sparkle inevitably weakens froth retention.

Practical brewers often express the gloomy opinion that there is no solution for this conflict of interests in achieving highest quality in beer, and in the main this investigation bears them out. In dark beers, however, the melanoidins which impart the dark color exert a natural protective colloid action which preserves clarity and probably also improves froth retention thus making it possible for the same beer to rank high both in appearance and in froth retention.

Digest from "Proteins in Brewing," by B. D. Hartong, *Chemisch Weekblad*, **36**, 377, 1939 (Published in The Netherlands).

Micro-organisms on Apples Affect Cider Quality

YEASTS, MOLDS AND BACTERIA are carried to apples, even in the blossom stage, by bees and other insects, by birds and by air currents. The yeasts vary greatly in kind and proportion from tree to tree and from season to season. They cannot be relied upon for successful cider fermentations. For a definite, controlled result it is necessary to inoculate the pasteurized juice with pure cultures of known yeast strains, such as a good wine yeast.

Molds differ greatly in their effects on apple juices. Some impart little or no flavor, but *Penicillium* sometimes is a powerful flavoring agent and the resulting taint is destructive to unfermented juice. Some of the black rots impart a bitter tang, others have little effect.

Of the bacteria, the most troublesome are also among the most common. These are the acetic acid fermentation bacteria such as *B. xylinum*. Carbonation inhibits the acetic fermentation, so one of the best preventive measures is to maintain a steady yeast fermentation. The organisms causing ropiness and "cider sickness" are also common and demand preventive treatment.

Thorough washing of the fresh fruit and optimum storage conditions are the first essentials. After expressing the juice, a sterilizing filter imparts final sterility, if proper care is taken of the filtered juice.

Digest from "Microbiology of Fruit in Relation to Certain Fruit Products," by Verron L. S. Charley, *Chemistry and Industry*, **58**, 115, 1939 (Published in England).

CANNING & PRESERVING

Nomograms Simplify Calculations of Thermal Processes

THERMAL PROCESSING calculations for non-acid canned foods exhibiting straight-line, semi-logarithmic heating curves are greatly simplified by the application of a series of nomograms. These are constructed to provide a graphic means for carrying out the computations required in the Ball formula method. Examples are given in the article.

Digest from "Thermal Processing of Canned Foods in Tin Containers," by F. C. W. Olson and H. P. Stevens. *Food Research* **4**, 1, 1939.

Mineral Losses in Vegetable Canning

FROM TESTS made with fresh and dried peas and beans and with carrots, potatoes and spinach it has been found that total loss of minerals in canning is

★ Cercon is an edible, tasteless wax suitable for coating food products requiring protection from the air.

It is supplied in six colors—Snowdrift, Lemon, Orange, Tangerine, Apricot, and Olive. It has an ASTM penetration of 50 with the 50 gram weight attached.

We will be very glad to send test samples to any interested company.

THE CONEWANGO REFINING CO.
WARREN, PENNSYLVANIA

about the same as in cooking. If the cooking water is appreciably hard the calcium content increases, but there are losses of other inorganic constituents.

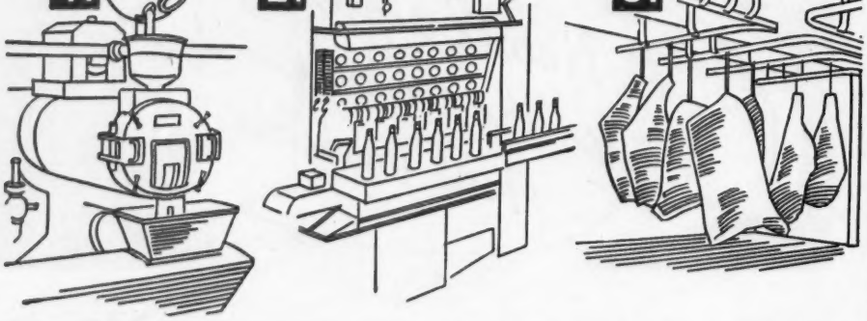
Efforts to diminish losses by adding sodium chloride to the cooking water were unsuccessful. That is, the added salt made little or no difference in the partition of inorganic constituents between the solid and liquid phases in the can. Separate determinations were made at different stages of canning to trace losses, and in some cases the results were compared with those observed in home cooking.

Blanching causes considerable loss, especially of potassium and other freely soluble constituents such as sugar. In blanching peas the sugar loss was much smaller with steam than with hot water, and it is probable that steam blanching would also save much of the potassium lost in hot water blanching.

Digest from "Effect of Cooking and Canning on Mineral Constituents of Certain Vegetables," by G. Horner, *Journal of the Society of Chemical Industry* **58**, 86, 1939 (Published in England).

HTH PRODUCTS*

Cut Spoilage Losses, Protect Purity



1. To protect the quality and purity of ice cream, all containers and equipment—cans, freezers, pasteurizers, homogenizers, etc.—must be kept not only clean but germ-free. That is why HTH Products are used in so many successful ice cream plants.

2. The sanitation problem of the beverage bottler is two-fold. His products must meet rigid public health requirements and they must be free from molds, yeasts and other micro-organisms that cause spoilage—a job made-to-order for HTH Products.

3. Meat packers find HTH Products effective and dependable for sanitation in every part of the plant—edible rooms, killing floors, cookers, freezers, curing rooms, smoked-meat hanging rooms, cutting rooms, sausage manufacturing rooms, sliced-bacon coolers, etc.

Food and beverage plants cannot lose a single round in the constant battle against bacterial contamination without suffering substantial dollars-and-cents loss.

Save money—fight spoilage this simple, effective way. Use HTH Products for complete plant sterilization.

HTH Products are dependable chlorine sterilizers in powder form—convenient to use, always full-strength, quickly effective in action. Added to water, they make germicidal hypochlorite solutions of the desired strengths for flushing or spraying all surfaces with which food or beverage products come in contact. And HTH Products are so economical, they can be used freely throughout the plant.

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HTH PRODUCTS

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DAIRY PRODUCTS

Usefulness of Stabilizers Limited in Refrigerator Ice Creams

As AGITATION affects the action of certain stabilizers, their usefulness in refrigerator ice creams is not the same as in commercial ice cream production. Although texture of refrigerator ice creams produced with certain stabilizers is not as smooth as in commercial ice cream, they are acceptable and palatable.

Best results are obtained with agar in combination with dried skim milk. Dried skim milk alone, chocolate, corn sirup, and increased sugar content exert some stabilizing effect, but can be made use of in limited concentrations only.

Egg yolk, india gum, pectin, gelatin, cornstarch and serum solids were found to impart undesirable characteristics.

Agar is useful in sherbets, whereas gelatin and pectin destroy their fine texture and light body. Agar or gelatin, combined with mayonnaise, are satisfactory in frozen fruit salads. Dry pectin causes lumping unless mixed with sugar.

Household recipes are given for the stabilizers that have been found to be most effective.

Digest from "Use of Stabilizers in Unagitated Ice Creams," by L. S. Bentley and B. M. Watts, *Food Research* **4**, 101, 1939.

Non-hygroscopic Whey Powder

CONTINUOUS DRYING of semi-solid whey material as it comes from the vacuum pan is provided for in U.S. Patent No. 2,118,252, granted to George Howard Kraft and assigned to Kraft-Phenix Cheese Corp., Chicago, Ill. High production rate with low production cost is claimed along with non-hygroscopic properties and fine state of division without the necessity of grinding or high pressure spraying.

The drying is carried on in a closed system through which circulates a hot drying gas such as heated air. By means of a cyclone type of separator-collector the moisture is carried off by the current of heated air while the whey solids fall to the bottom to be removed, cooled, and bagged or otherwise packed without any further form of treatment.

At the outset of the drying operation, the semi-solid whey material is blended with a substantial proportion of dry whey powder in a mixer-conveyor with an agitator of the chopping and propelling type and is fed continuously by screw into the main air duct for circulation through the dry-

ing system by a current of heated air. As the drying proceeds, a portion of the dried solids is withdrawn and bagged. The remainder is added to and mixed with the wet material and the cycle is repeated.

The lactose content of the final product is in a hydrated crystalline form.

Mold Counts in Butter

A MICROSCOPIC COUNT of the number of mold mycelia in butter is used as a test to indicate the quality of the cream from which the butter was made.

The number of mycelia in the butter is increased by: (1) higher temperatures of cream storage; (2) agitating the cream as each day's supply is added to the can after cooling; (3) larger surface of cream exposed to the air. The count can be decreased by cutting off all exposure of the cream to the air, by covering the cream with a layer of mineral oil, for example.

Variations in manufacturing procedure such as different sizes of fat granules, neutralization of cream, etc., do not affect the mold count. The count is no indication of the flavor and quality of the butter, but gives some idea of the sanitary quality of the cream.

Digest from "Some Factors Influencing the Amount of Mold Mycelia in Butter," by Joseph Adams and E. H. Parfitt, *Journal of Dairy Science*, **22**, 367, 1939.

Flavor of Swiss-type Cheese Improved by Propionates

FLAVORS characteristic for different types of cheese are due to a combination of flavor components developing in the cheese during processing. Micro-organisms are known to be largely responsible for specific cheese flavors, although at times the milk enzymes and the rennet are contributing factors.

The abundance of propionic acid organisms (*Proprionibacterium*) in highly flavored Swiss-type cheese suggests that certain substances formed by these bacteria contribute to the characteristic sweet flavor, so desirable in this cheese.

A definite correlation between the intensity of the sweet flavor and the volatile acidity in the cheese indicates the importance of these acids or their salts for flavor development. Cheese, lacking in flavor, showed great improvement when calcium or sodium propionates were added during processing. The former has a more pronounced effect than the latter. Larger quantities of added propionate increased the flavor.

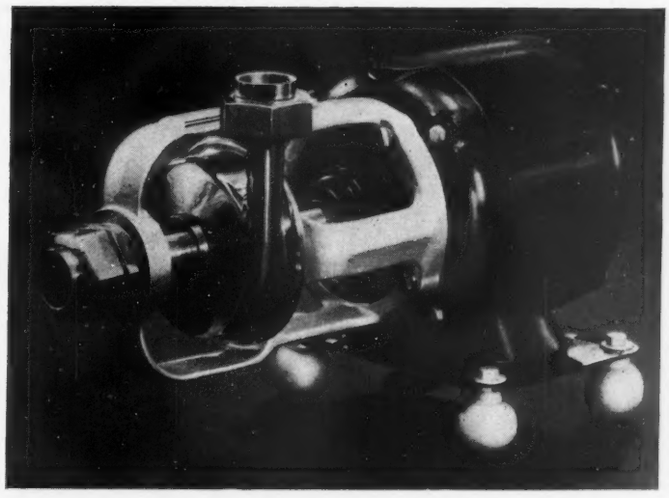
They also resulted in lighter color and a texture more like that of natural Swiss cheese, indicating that the formation of propionates plays an important part in the natural ripening of Swiss-type cheese. Presumably, various propionates are formed through bacterial action, accounting for the sweet flavor. The acetates developing simultaneously appear to have no great significance for flavor production.

Digest from "Flavor Contributors of Swiss-Type Cheese," by F. J. Babel and B. W. Hammer. *Food Research* **4**, 81, 1939.

MEAT PRODUCTS

Storage Time Allowable For Frozen Pork

EFFECTS of freezing on the fat in pork were tested by storing frozen pork a year. At —18 deg. C. (0 deg. F.) the fat remained unharmed, i.e., without deterioration in odor, flavor, appearance or color and with no significant change in chemical properties. But at —8 deg. C. (18 deg. F.) there was serious deterioration, manifesting



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itself in much less than a year. After six months, the outer layer of fat was noticeably yellowed, and inferior in flavor, while its chemical properties had changed considerably. After another six months, the fat was totally unfit for use to a depth of about ⅛ to ⅙ in. These results indicate that pork stored at –8 deg. C. should not be kept more than three or at most four months. If longer storage is required the temperature should be –18 deg. C.

Digest from "Changes in Fat of Frozen Pork in Prolonged Storage," by E. I. Novikova, *Kholodilnaya Promyshlennost* 16, No. 4, 30, 1938 (Published in Russia).

What Iron in Foods Is Utilized?

THE THEORY that ionizable iron in foods is a measure of the iron available for use in the body is well supported by a number of investigations, made since the theory was proposed some years ago. But there have also been some contradictory experimental results. There are many chances for error in the intricate analysis by which ionizable iron is quantitatively determined and distinguished from iron which is not ionizable.

The iron in meat is mainly derived from blood (hemoglobin), and is not available for body use because it is in organic combination (not ionizable). It is believed that when the chemical analysis clearly distinguishes this and other organic forms of iron from ionizable forms, the analytical result agrees well with feeding tests on rats, dogs or other laboratory animals. When errors cloud the chemical analysis, it fails to agree with the feeding tests, and so fails to support the theory that ionizable iron represents available iron.

On the other hand, there are also many chances for error in the feeding tests, and the best information now at hand is insufficient to prove that ionizable iron truly represents the available iron in foods. The question is not likely to be settled soon, but meanwhile there are a few principles that may be followed in judging foods for their iron value. It is generally agreed that inorganic iron is more likely to be assimilated than organic iron, and that ferrous salts are more freely used than ferric salts, but that at best only a relatively small portion of the inorganic iron in food is actually utilized.

Digest from "Ionizable and Available Iron in Foods," by R. A. McCance, *Chemistry and Industry* 58, 528, 1939 (Published in England).

SUGAR

Decolorizing Sugar Juices With Light Metals

THE DECOLORIZING ACTION of aluminum alloys and magnesium alloys was tested in sugar juices. Alkalinity of the juice has no pronounced effect on the decolorizing action of light metal or alloy shavings, but especially good effects were often obtained in acid juices. Surface area of the metal shavings is the principal factor. Among aluminum alloys, Silumin and KSS metal were most effective but all the aluminum alloys were surpassed by the magnesium alloys such as Elektron metal. Indeed, magnesium alloys shavings are so active that 0.4 to 2 per cent by weight will decolorize a juice or preserve a decolorized juice from discoloration. Pure aluminum, on the other hand, is least active, especially at low alkalinities. For this reason it holds some promise as a corrosion-resisting material for sugar refinery equipment.

Digest from "Action of Light Metal Alloys on Sugar Juices," by Hellmut David, *Deutsche Zuckerindustrie* 64; 275, 297, 319, 365; 1939 (Published in Germany).

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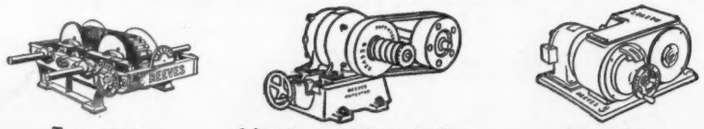

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BOOKS RECEIVED

First Annual Blue Book Edition of *National Carbonator and Bottler*. Edited by A. S. Loyless. Published by Loyless Publishing Co., Commercial Exchange Bldg., Atlanta, Ga. 1939. 340 pages; 9½x12½ in.; stiff paper.

This is a reference manual and buyer's guide covering all phases of the bottling industry. It provides for the bottle plant operator information of practical value. It is divided into twelve sections: Raw Materials and Supplies; Plant Processes; Mechanical Controls and Tests; Reference Tables; Plant Layout; Distribution; Directories (company and trade names, products directory); Sales Force; Merchandising; Miscellany; and Food Regulations.

Operating Results of Consumer Cooperatives in the United States in 1937. By Carl N. Schmalz. Published by the Graduate School of Business Administration, Harvard University, Soldiers Field, Boston, Mass. 1939. 37 pages; 8½x11 in.; paper. Price $1.

One section of this is devoted to food stores, covering the effects of sales volume and the size of the city, meat, and cooperatives vs. private enterprise. Operating cost data are given in tabular form.

Municipal Milk Distribution in Tarboro, North Carolina. By A. J. Nixon and O. M. Reed. Published by the United States Department of Agriculture, Washington, D. C., December, 1938. 30 pages; 5⅞x9¼ in.; paper. Free.

Information on costs of operation, on prices received by farmers and paid to consumers and on the service rendered by the only municipal milk plant in the United States will be of interest to executives in the dairy industry.

Handbook of the Federal Food, Drug and Cosmetic Act and Enforcement Regulations. Published by Container Corporation of America, 111 West Washington St., Chicago, Ill. 1939. 133 pages; 5½x8 in.; paper. Free.

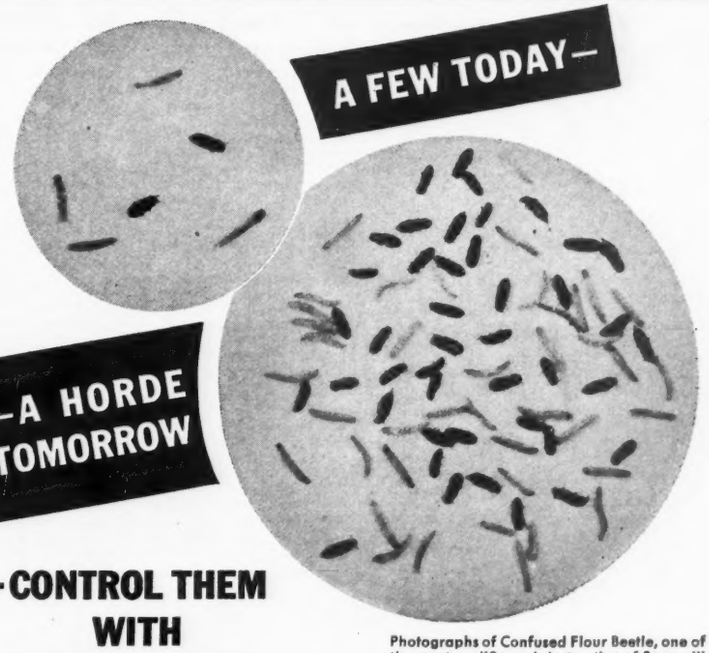
Equipped with a 25-page index, this provides a convenient reference book for the manufacturer who must conform to the new food law. Full text of the law, plus a summary, is given. A questionnaire brings out pertinent points.

Index to Literature of Food Investigation, Vol. 10, No. 2, September, 1938. Compiled by Agnes Elisabeth Glennie. Published by His Majesty's Stationery Office, London, 1938. 187 pages; 6x9¾ in.; paper. Price, $1.35; obtainable in America through British Library of Information, 50 Rockefeller Plaza, New York, N. Y.

No less than 619 references to articles on food technology are cited, and in many instances basic principles are abstracted. Coverage is world-wide.

Fruit and Vegetable Juices. By Donald K. Tressler, Maynard A. Joslyn and George L. Marsh. Published by Avi Publishing Co., Inc., 31 Union Square, New York, N. Y. 1939. 549 pages; 5¾x8¼ in.; cloth. Price, $6.

As would be expected from the names of the authors, this volume is



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rather solidly packed from cover to cover with practical operating and technical information. Starting with the principles of preparation and preservation of fruit juices, the book describes and illustrates how to lay out the processing plant, tells what methods and equipment to employ and what to do with fruit wastes. Methods and equipment for freezing fruit juices are included. Specific attention is given to processing apple, citrus, pineapple, grape, cherry, berry, tomato, and sauerkraut juices, and to beverages made from fruit and vegetable juices. A chapter is devoted to blending formulas and sirup algebra, and at the end of the book is a buyer's directory listing the manufacturers of the various types of equipment needed in processing fruit and vegetable juices.

PATENTS

Gelatin Whipping Power Increased by Substituting a Hydroxyl For an Amine Group in the Gelatin Molecule—Donald P. Grettie, to Industrial Patent Corp., Chicago, Ill. No. 2,158,117. May 16, 1939.

Oils and Fats Bleached by Treatment With Hydrogen Peroxide and a Nitrite—Walter M. Urbain and Lloyd B. Jensen to Industrial Patents Corp., Chicago, Ill. No. 2,158,163. May 16, 1939.

Hygroscopic Material Dried in Sheet Form by Moving Counter-Current Through Stream of Air Whose Relative Humidity When Entering System is Below Critical Point of That of the Material When Dry—William W. Cowgill, Fairfield, Conn., to Sardik Inc., Jersey City, N. J. No. 2,158,354. May 16, 1939.

Bread Made to Retain Freshness by Incorporation of Edible Soluble Alginate—Roger W. Ament, Inglewood, Calif., to Kelco Co., Los Angeles, Calif. No. 2,158,392. May 16, 1939.

Veal Carcasses Tightly Wrapped in Semi-Moisture Proof Covering to Reduce Shrinkage and to Bleach Surface of Carcass—Harry J. Koenig, to Armour & Co., Chicago, Ill. No. 2,158,462. May 16, 1939.

Wheat Flour Bleached and Matured Through Addition of Powdered Bromate and Powdered Active Organic Peroxide of Aromatic and Fatty Acid Origin—Frederic H. Penn, Dallas, Tex. No. 2,158,588. May 16, 1939.

Wheat Flour Bleached and Matured by Addition of Powdered Iodate and Powdered Active Organic Peroxide of Aromatic and Fatty Acid Origin—Frederic H. Penn. Dallas, Tex. No. 2,158,589. May 16, 1939.

Dry Shortening For Cake Containing a Sulphated Triglyceride—Benjamin R. Harris, Chicago, Ill., to Procter & Gamble Co., Cincinnati, Ohio. No. 2,158,775. May 16, 1939.

Pies Made on a Machine Embodying a Straight Line Endless Conveyor Carrying Crust Forming Plates—Sidney H. Pellar, Chicago, Ill. Nos. 2,158,910 and 2,158,911. May 16, 1939.

Gases In Coffee and Nut Roasters Purified by a Cracking and Oxidizing Treatment—Michael M. Jalma and Henri Coutinho, to Michael M. Jalma, New York, N. Y. No. 2,159,027. May 23, 1939.

Fresh Whole Fruit Freed From Surface Water by Mechanical Brushing and Contact with Heated Air—Hale Paxton and Gerald C. Paxton, Santa Ana, Calif., to Food Machinery Corp., San Jose, Calif. Nos. 2,159,046 and 2,159,047. May 23, 1939.

Beer Given Reduced Intoxicating Power Through Addition of a Water-Alcohol Soluble Carbohydrate Ester—Leon Lilienfeld, Vienna, Austria. No. 2,159,167. May 23, 1939.

Granular Pectin Products Formed by Mixing Dried Powdered Pectin Into Heated Liquified Dextrose Hydrate and Cooling—Clarence Walter Wilson, Corona, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,159,194. May 23, 1939.

Mechanical Means for Making Frozen Cream—John Parcell, New York, N. Y. No. 2,159,450. May 23, 1939.

Starch Liquifying Enzymic Material Made by Culturing *Bacillus mesentericus* in a Digested Soya Meal Medium—Alfred Schultz and Lawrence Atkin, New York, N. Y., and Charles N. Frey, Scarsdale. N. Y., to Standard Brands Inc., New York, N. Y. No. 2,159,678. May 23, 1939.

Ice Cream Sundae Served in Cone—William H. Frederickson, Seattle, Wash. No. 2,159,761. May 23, 1939.

Beer and Ale Protected Against Oxidation and Development of Rancidity by Addition of Ascorbic Acid as Stabilizing Agent—Philip P. Gray, Forest Hills, and Irwin Stone, New York, N. Y., to Wallerstein Co., Inc., New York, N. Y. Nos. 2,159,985 and 2,159,986. May 30, 1939.

Pasteurized Uncured Soft Cheese of Acid Type Made From Low Fat Content Milk—Erik Lundstedt, Goshen, and Joel Taub, Brooklyn, N. Y., to Newark Cheese Co., Inc. No. 2,160,159. May 30, 1939.

Baking Powder Made to Contain Particles of Finely Divided Anhydrous Monocalcium Prosphate Containing Less Than 10 Per Cent of Pyrophosphate and Having a Thin Relatively Insoluble Coating—Julian R. Schlaeger, Chicago Heights, Ill., to Victor Chemical Works. No. 2,160,233. May 30, 1939.

Eggs Graded as to Weight and Packed Into Cartons by Mechanical Means—George A. Swartz, Hillsdale Manor, N. J. No. 2,160,319. May 30, 1939.

Bread Slicing Machine—Norman W. Lyon, to National Bread Wrapping Machine Co., Springfield, Mass. No. 2,160,387. May 30, 1939.

Crystallization From Solution Carried on in a Continuous Manner by Evaporation or Cooling—Richard Bonath, Bussum, Netherlands to Werkspoor N. V. Amsterdam, Netherlands. No. 2,160,533. May 30, 1939.

Eggs Prepared for Cold Storage by Quick Chilling in Weak Solution of Caustic Soda—Howard H. Stamper, to F. M. Stamper Co., Moberly, Mo. No. 2,160,604. May 30, 1939.

Baking Powder Made to Contain Unground Crystals of Solid Anhydrous Monocalcium Phosphate With a Particle Size Below 100 Mesh and a Hydration of Not More than ¼ Mole of Water in 24 Hours at 39 Deg. C. and 65 Per Cent Relative Humidity—William H. Knox, Jr., Nashville, Tenn., to Victor Chemical Works. No. 2.160.701. May 30. 1939.

Crisp, Toasted Products Made From Beaten Cooked Potatoes, Wheat Flour, Albumen, Leavening Agent, and Salt—Charles A. Raymond, Marion, Ohio. No. 2,160,902. June 6, 1939.

Flour Bleached by Spreading Over and Sifting Through Perforated Horizontal Surfaces While in Contact With Bleaching Agent—Campbell Houk Smith, to J. Allen Smith & Co., Knoxville, Tenn. No. 2,160,918. June 6, 1939.

Milk Bottles Sealed by Mechanical Shaping of Closure to Conform to Bottle Top Finish After Filling—John Wayne Thomas, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa. No. 2,160,992. June 6, 1939.

Meats and Similar Solid Foods Coated With a Composition of Gelatine and Water Containing a Fatty Material Which Solidifies at Normal Room Temperatures—Henry Carl Eckrich and Herman J. Eckrich, Sr., Fort Wayne, Ind., to Peter Eckrich & Sons, Inc., Kalamazoo, Mich. No. 2,161,029. June 6, 1939.

Foods to be Frozen in Moisture-Proof Containers Subjected to Lateral Pressure Until Partially Filled Container is Sealed, Pressure Released to Permit Freezing Without Swelling or Bursting the Walls of the Container—Leigh J. McGrath and Wayne L. Hall to Zellerbach Paper Co., San Francisco, Calif. No. 2,161,071. June 6, 1939.

Rice Pre-cooked and Dried for Canning to Give a Whole Loose-Grained Final Product—Nicholas C. Coan, Houston, Tex. No. 2,161,119. June 6. 1939.

Oven With Endless Belt Conveyor Heated by Directing Air Against Both Upper and Lower Sides of Moving Belt—Frank Charles Werner, Grand Rapids, Mich. No. 2,161,211. June 6, 1939.

Marmalade Base Made by Concentrating Fruit Juice, Further Dehydrating Fruit Juice by Mixing With Anhydrous Dextrose to Give Thick Plastic Mass and Adding Fruit Pieces Impregnated With Glycerine—James H. Stanton Vancouver, British Columbia, Canada. No. 2,161,238. June 6, 1939.

Pretzels Twisted Mechanically—William M. Young and Lemon Blair Paules. Harrisburg, Pa. No. 2,161,267. June 6, 1939.

Cheese Plasticized by Treatment With a Pre-Boiled Mixture of a Fatty Acid, Soya Flour, and a Small Quantity of Caustic Soda—Charles Doering and W. Kedzie Teller, to Henry H. Doering, Chicago, Ill. No. 2,161,401. June 6, 1939.

Meat Shrinkage During Roasting Lessened by Injection of Solution of Mono-Sodium Glutamate and Sodium Chloride in the Ratio of One to Two by Weight—Hugh E. Allen, one-half to Albert G. McCaleb. Evanston, Ill. No. 2,162,047. June 13, 1939.

Frozen Food Defrosted on Surface Preliminary to Quick Refreezing and Glazing—Chester J. Conn. Smithtown Branch, N. Y. No. 2,162,213. June 13, 1939.

Foods to be Quick-Frozen Given a Preliminary Surface Freezing and Glazing—Chester J. Conn. Smithtown Branch, N. Y. No. 2,162,214. June 13, 1939.

Yeast Grown in a Wort of High Concentration With Vigorous Aeration—Johann Hilbers, Oldenburg-Etzhorn, Germany. No. 2,162,217. June 13, 1939.

Egg Whites Given Controlled Fermentation Preliminary to Drying—Marvin C. Reynolds, deceased, to The Emulsol Corp., Chicago, Ill. No. 2,162,316. June 13, 1939.

Cereal Breakfast Food Made in Puffed Pellet Form—Ferdinand A. Collatz, St. Paul, Minn. to General Mills, Inc. No. 2,162,376. June 13, 1939.

Peanuts Cleaned by Gravity Separation While Dropping Through a Directed Air Blast—Nicholas B. Solomon, Jr. and Dannie M. Carter, Blakely, Ga. No. 2,162,392. June 13, 1939.

Egg Meats Freed From Egg Shell Pieces and Fibrous Strings By Being Forced Through Screen Under Gas Pressure—Frank B. Lomax, Chicago, Ill. Reissue No. 21,122. June 20, 1939.

Gelatin Dessert Powder Made by Mixing Sugar, Dry Gelatin, Fruit Acid or Salt and Fruit Concentrate to Give Dough-Like Mixture and Heating to About 130 deg. F. With Aeration—Leonard Wickenden, Manhasset and William Baptiste, Brooklyn, N. Y. to Beau May Process Corp., New York, N. Y. No. 2,163,164. June 20, 1939.

Malt Enzymes Extracted from Mash by Combination With Aluminum Silicate—Eberhard Heimann, Berlin-Schoneberg, Germany. No. 2,163,200. June 20, 1939.

Liquid Whey Mixed With Dry Milk Powder Preliminary to Drying in Thick Sheet Form—John R. Spellacy, Burlingame, Calif., to Hercules Powder Co., Wilmington, Del. No. 2,163,331. June 20, 1939.

Beer Wort Hopped by Adding Hop Components Separately; Lupulin With Cooking Under 10 lb. Pressure and the Leaves With Cooking at About 5 lb. Pressure at Boiling Temperatures and Without Substantial Evaporation of Water—Carl Rach. New York, N. Y. No. 2,163,468. June 20, 1939.